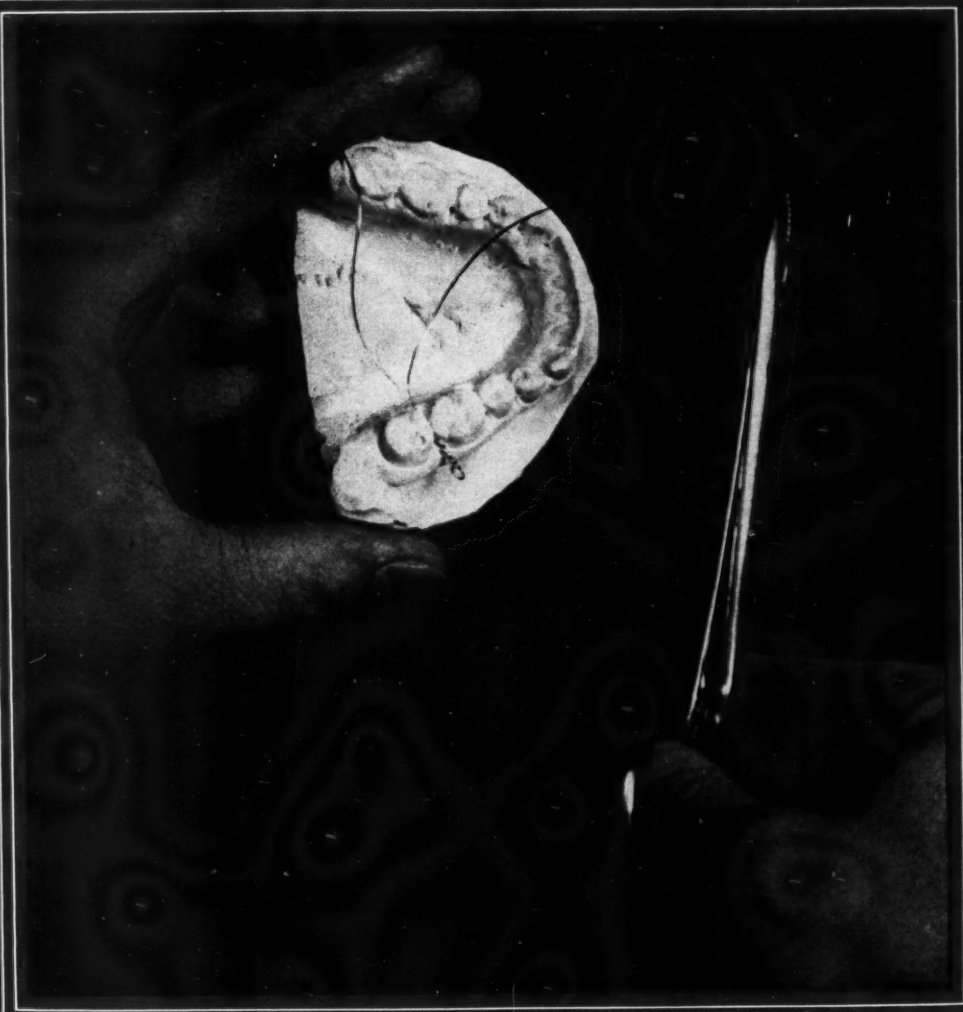
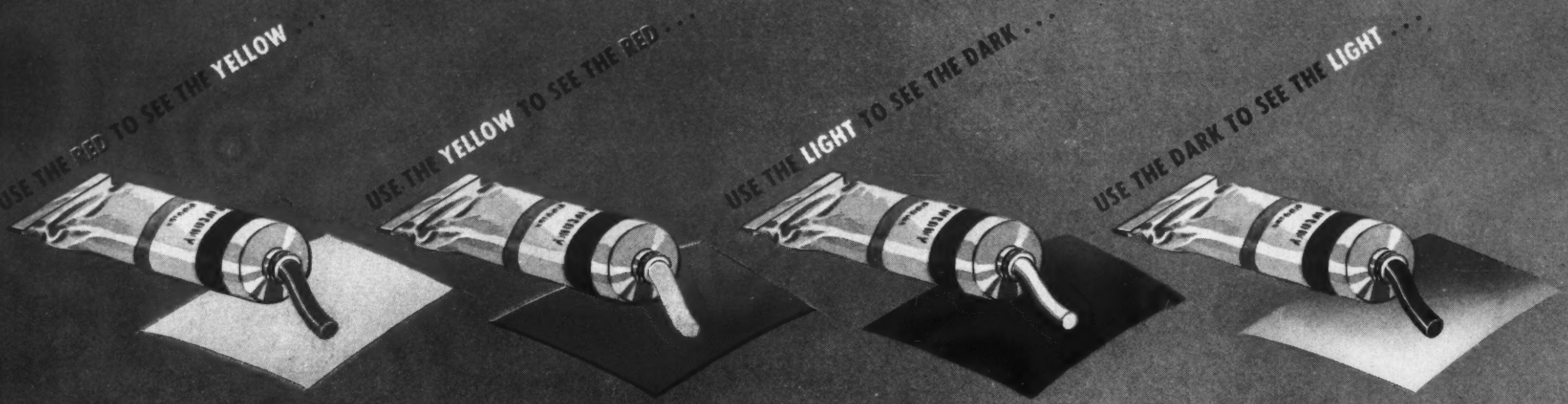
THE DENTAL Digest



MARCH 1946

BUY SAVINGS BONDS



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THE DENTAL Digest

VOL. 52 NO. 3

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About Our CONTRIBUTORS

ARTHUR S. HAYNEN, D.D.S. (McGill University, Faculty of Dentistry, 1938). Doctor Haynen was in Greenland with the Greenland Delegation in 1940-1941, and in the Armed Services from February 1941 to December 1945. He reports a case history of CIRCUMFERENTIAL WIRING.

CHARLES H. MOSES, D.D.S., L.D.S. (University of Toronto, Faculty of Dentistry, 1924) emphasizes prosthodontics in his practice. Doctor Moses has contributed previously to the dental literature. His presentation is A CRITICAL ANALYSIS OF THE FACTORS IN THE RETENTION OF DENTURES.

JULIUS G. GODWIN, D.D.S. (Washington University, School of Dentistry, 1941) is an instructor in exodontia and oral surgery at the Saint Louis University, School of Dentistry. Doctor Godwin has presented articles in many dental journals in the last few years. In this magazine he discusses A SPECIAL TECHNIQUE FOR THE REDUCTION OF THE MYLOHYOID RIDGE.

LIEUTENANT COMMANDER HARRY ELTON DENEN (DC) USNR received his D.D.S. at the Chicago College of Dental Surgery, Loyola University, in 1922. Commander Denen, who is engaged in prosthodontics, has published numerous articles on this phase of dentistry. His article here is A TECHNIQUE FOR THE REPLACEMENT OF BROKEN BRIDGE FACINGS.

FRED A. SLACK, JR., D.D.S. (University of Pennsylvania, 1932) has published several articles with us on the use of acrylic. In December 1943 his subject was attachments and reinforcements for acrylic pontics. This month he presents a case report of treatment of hydrocephalus by the application of a methylmethacrylate cap to the infant's head.

Circumferential Wiring: Report of a Case

ARTHUR S. HAYNEN, D.D.S., GLENS FALLS, NEW YORK*

The illustrated case history presented is that of the repair of a mandibular fracture by means of circumferential wiring and the use of the lower denture as a splint.

History

A man, aged 60, in good physical condition, received a fracture of the mandible in the region of the left mental foramen in a fall down stairs. The lower denture broke at the symphysis at the time of the accident. The patient was not referred to my dental office until one week after the accident.

Examination

Examination revealed mobility of the fragments at the fracture site, and slight swelling of the facial soft tissues. There was only slight discoloration of skin tissue, and comparatively little pain. Lateral and anteroposterior roentgenograms revealed the fracture line to be split, and a triangular piece detached at the lower border of the mandible.

Operative Technique

Because of the age of the patient, and the resorption of the alveolar process, a circumferential wiring was decided on rather than a direct bone wiring or the insertion of a vitallium plate. The broken denture was repaired in the office, and the patient was admitted to the hospital where the following treatment procedure was carried out:

1. Morphine, ¼ grain, and atropine, 1/150 grain, were administered one hour previous to operation.

2. Ether anesthesia was administered for the operation.

3. A small incision, ¼ inch in length, was made on the under surface of the mandible in the region of the left first molar.

4. An antrum trocar was pushed upward through the incision, keeping the trocar close to the inner border of the mandible until it penetrated the floor of the mouth lingual to the body of the mandible in the first molar region. The trocar was then withdrawn, leaving the cannula in place.

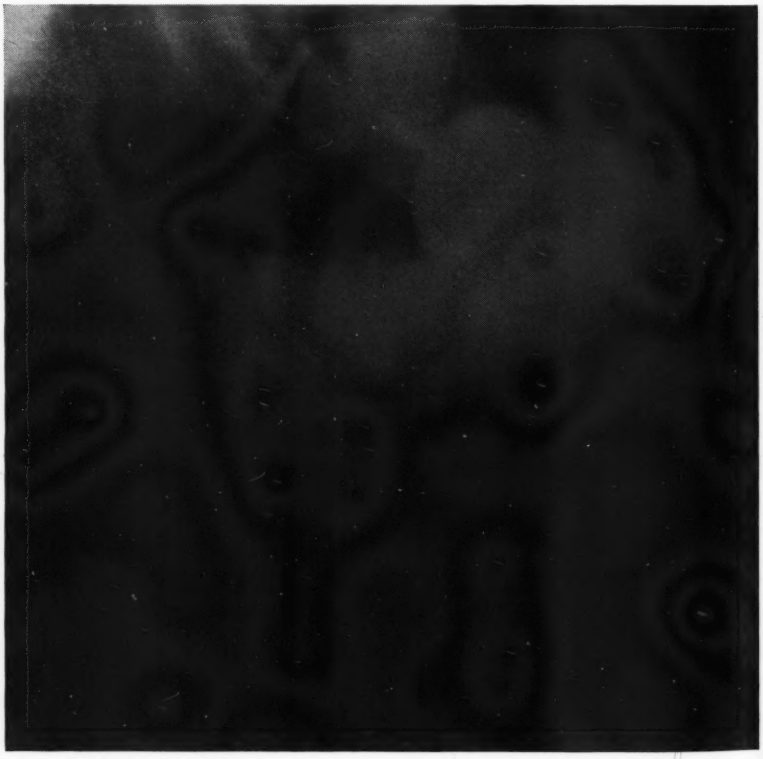
5. Eighteen-gauge silver wire was threaded through the cannula into the mouth, and the cannula was withdrawn.

6. Another trocar was passed through the mucobuccal fold in the region of the first molar, then *downward* buccally close to the mandibular bone, to emerge at the site of the original incision. This trocar was then withdrawn, leaving the cannula in place.

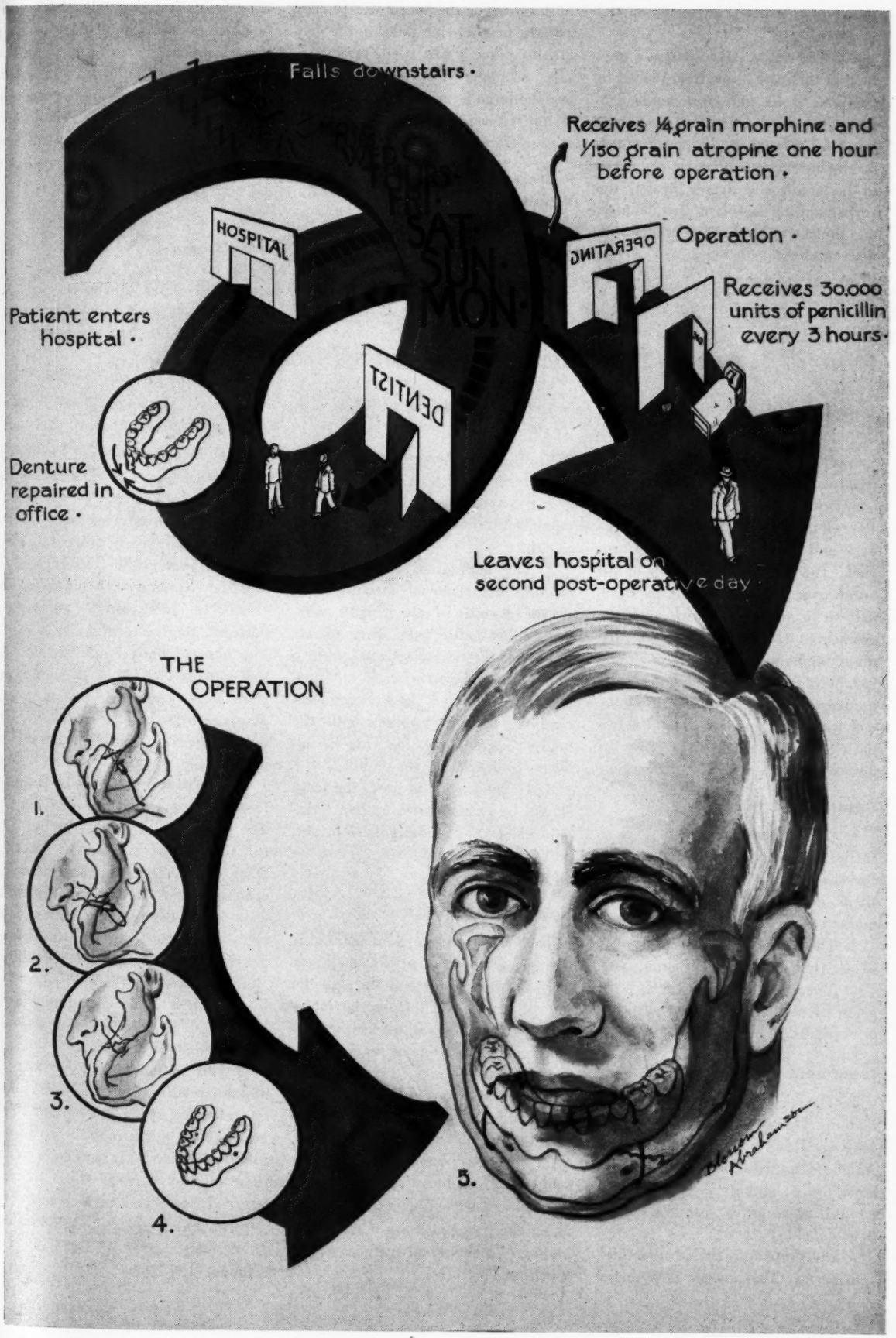
7. The lower end of the silver wire was passed upward through the cannula into the mouth, and the cannula was withdrawn.

8. The wire now encircled the under surface of the mandible, one end emerging in the mouth lingual to the first molar region, and the other end emerging buccally in the same region.

9. A wire was inserted in the same manner to encircle the mandible on



*The author wishes to acknowledge with thanks the assistance of Miss Grace, laboratory technician, Doctor Harry DePan, anesthetist, and Doctor Frank Chapman, co-surgeon.


Falls downstairs.
Receives ¼ grain morphine and 1/150 grain atropine one hour before operation.
HOSPITAL
OPERATING
Operation.
Receives 30,000 units of penicillin every 3 hours.
Patient enters hospital.
DENTIST
Denture repaired in office.
Leaves hospital on second post-operative day.
THE OPERATION
1.
2.
3.
4.
5.

the right side posterior to the mental foramen.

10. The splint (the patient's denture in this case) was then placed in position. Holes had been made previously in the denture, using a fissure bur, one hole on the lingual and two on the buccal on each side. The wires in the mouth were drawn through the corresponding holes in the denture, and the two on each side of the mouth were twisted together firmly. The ends of the wires on the buccal were turned into the neighboring holes in the denture to prevent soft tissue irritation. The accompanying roentgenogram and the large figure in the illustration on the preceding page show the operation completed.

Postoperative Treatment and Results

The patient was given 30,000 units of penicillin intramuscularly every three hours until his release from the hospital on the second postoperative day. A soft high caloric diet was recommended for the first two weeks, with adequate vitamin intake as a supportive measure. The splint and wires were tolerated well by the patient, and a satisfactory recovery was made.

37 *Bay Street.*

Penicillin in the Treatment of Vincent's Infection

Captain D. S. MOORE (CDC), St. Johns, Newfoundland

I HAVE used periodontal packs for treatment of Vincent's infection for over two years. Excellent results were obtained with both H. K. Box's pack and the Canadian Dental Corps pack. The ease of application of the latter over all other mixtures tried, led me to combine it with other ingredients (sulfathiazole, sulfanilamide, alphamel ointment, penicillin in lanolin, penicillin in alphamel) for quicker results. Penicillin in alphamel with the Canadian Dental Corps pack (fifty-nine acute cases) gave the best results.

Results of Treatment

1. Cures resulted after thirty-six to forty-eight hours. A few were left on for seventy-two hours when the patients could not be given appointments sooner.

2. There was only one application of the pack in forty-one of the cases.

3. Twenty thousand units per gram of alphamel is being used for best results.

Treatment Technique

1. The pack consists of the Canadian Dental Corps periodontal pack or Box's pack as the base to which is added about ½ gram of penicillin in alphamel. The liquid is about four drops of 2 per cent thymol in eugenol.

a) The pack is mixed to a thick consistency. The powder is pounded in, rather than spatulated, until the mixture is as thick as putty.

b) A half gram of ointment is enough for completely packing one mouth.

2. The supragingival deposits of calculus are removed carefully and, if the mouth is abnormally sore, Churchill's iodine and silver nitrate is applied first. If the teeth are in a poor condition, a mixture of equal parts of metaphen and 7 per cent chromic acid is applied with the beaks of cotton pliers. This is followed by hydrogen peroxide.

3. If Box's pack is used, the teeth should be cleaned with carbon tetrachloride to aid in the adhesion, and additional powdered resin must be added.

Application of Pack

The easiest and quickest method is to apply pellets the size of a small pea.

1. A pellet is pressed through the interproximal space from the labiobuccal to the lingual with either the finger or an instrument until the tissue blanches.

2. It is then locked by pressure on the labiobuccal and lingual surfaces with the thumb and forefinger.

3. Then long round pieces, like a lead pencil, made by rolling the material with one's finger, are packed along the gingival margin at the labiobuccal and lingual surfaces of the dentition.

4. The rolls are pressed apically to permit the escape of food from the interproximal spaces.

5. If a concavity persists in the interproximal space from labial to lingual due to tissue destruction, it must be eliminated. If this concavity cannot be eliminated by subsequent packing, gingivectomy must be done. The base of the triangle formed by the contact point and the proximal sides of the teeth (the interproximal gingiva) must be at least flat, preferably convex, from labiobuccal to lingual.

6. The pack must remain in place from thirty-six to forty-eight hours. The patient is cautioned to be careful of the pack and not to eat anything tough. Drinking and smoking are contra-indicated. A mouthwash is used after twenty-four hours, four times a day, to rid the mouth of food debris and to replace toothbrushing.

7. The consumption of three or four oranges a day is advised as a laxative. The vitamin-mineral content likewise is beneficial.

8. The patient must be warned about spreading the disease and must be instructed in the precautions to be taken. Although a mouthwash is not used in all cases, it is beneficial where there are suppressed third molars, gingival flaps, and carious teeth.

—From *The Journal of the Canadian Dental Association* 11:543-552 (December) 1945.

A Special Technique for Reduction of the Mylohyoid Ridge

JULIUS G. GODWIN, D.D.S., Saint Louis

A specially designed instrument for reducing prominent mylohyoid ridges is described, and the technique for its use in the operation is presented.

THE PROSTHODONTIST often finds, in edentulous patients, a sharp bony spine of the mylohyoid ridge in the mandible, which interferes with the proper seating of the denture, thus making impossible an adequate peripheral seal of the denture in this area. This article constitutes a report on a technique employed at Saint Louis University, School of Dentistry, for the reduction of sharp, prominent mylohyoid ridges, making use of an instrument which I designed specially for this operation.

Description of Instrument

Figure 1 shows the parts of the instrument assembled. Figure 2 pictures the parts of the instrument: Part A was made from an instrument sharpener and is fitted on a straight handpiece. Part B, the protector shield, its end being bent back intentionally, was designed and constructed to be screwed into part A. The surgical bur (C) is mounted on a straight handpiece in the usual manner, and should be adjusted to the protective shield. The protective shield will hold the flap back to obviate the risk of injuring the mucoperiosteal flap; the surgical bur (C) cuts down and smooths the sharp, prominent mylohyoid ridge.

Operative Technique

1. The design of the flap to be used in this operation should be such as to permit adequate exposure of the involved area and the introduction of the specially designed instrument.

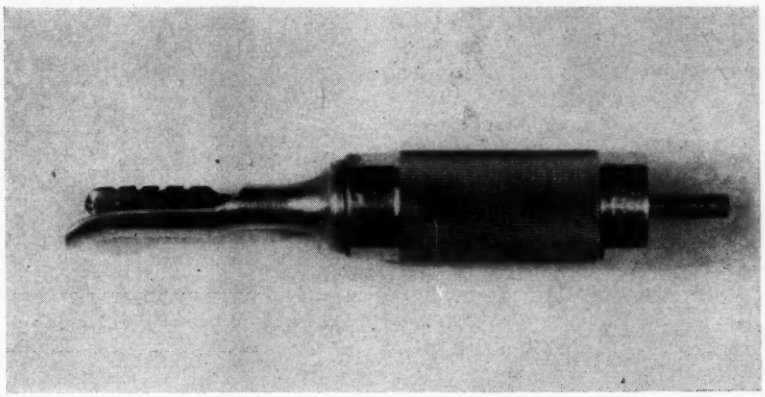


Fig. 1—Specially designed instrument (assembled) for reduction of sharp, prominent mylohyoid ridges.

Figure 3 illustrates the type of flap which I use most frequently in these cases (angulating flap):

a) The incision is carried in an anteroposterior direction along the crest of the ridge slightly toward the lingual. The length of the incision will depend on the extent of the bony prominence to be removed.

b) This anteroposterior incision

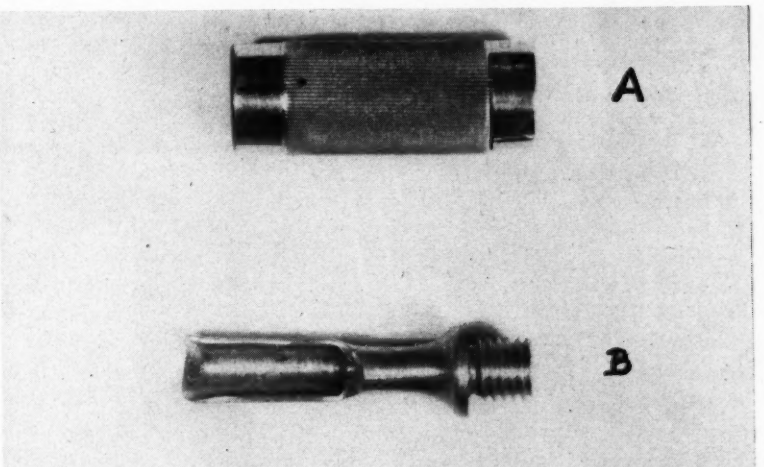


Fig. 2—Parts of instrument: (A) Attachment to be mounted on straight handpiece; (B) protective shield with end bent back; and (C) surgical bur.

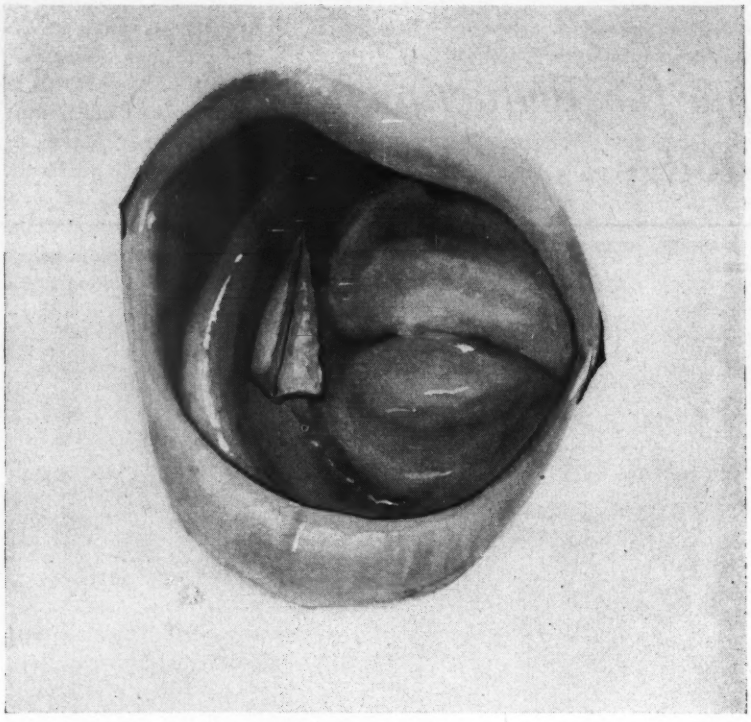


Fig. 3—Design of flap (angulating) for reduction of the mylohyoid ridge with the instrument.

Fig. 4—Protective shield holds flap back, preventing injury of mucoperiosteal flap; surgical bur cuts and smooths mylohyoid ridge (lingual reduction).

is joined anteriorly by an oblique incision made downward on the lingual aspect of the mandible.

c) Occasionally an additional lingual incision is necessary to join the anteroposterior incision posteriorly.

d) Care must be taken that the sharp, pointed knife cuts through the full depth of the mucoperiosteum down to the bone so that virtually all the fibers will be severed. This will prevent, to a large extent, the tearing and mutilating of the gingival tissue when the flap is subsequently elevated. It should be borne in mind that a long time is required for the repair of torn and bruised tissue.

2. The flap thus outlined, composed of mucous membrane, submucosa, and periosteum, is raised gently and reflected lingually with a small, sharp periosteal elevator. Great care should be taken not to traumatize the tissues.

3. After the mucoperiosteal flap has been elevated, the instrument shown in Figure 1 is inserted between the flap and the mylohyoid ridge. The protective shield of the instrument will hold the flap back and prevent its becoming entangled in the surgical bur (Fig. 4). A few motions with the instrument in an anteroposterior direction will usually suffice to cut down and to smooth the sharp edge of the mylohyoid ridge.

4. All these procedures should be carried out with the least possible trauma and without excessive retraction of the soft tissues. Undue laceration increases the danger of infection and will lead to sloughing.

5. Before suturing the flap to place, the wound is irrigated with warm saline solution, and then the flap is returned to its original position.

6. The final step in the operation is the proper approximation of the wound edges. Suturing is definitely indicated. To ensure an atraumatic suture technique it is often advisable to interrupt the course of the needle by first drawing it completely through one lip of the wound, then taking a second bite through the other lip. I usually place two or three interrupted sutures. In this way, the divided tis-

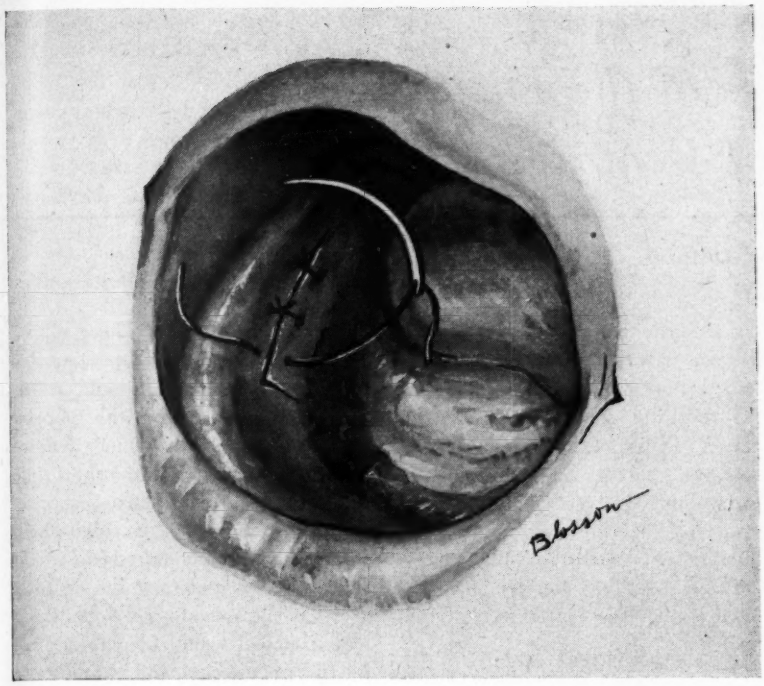


Fig. 5—The mucoperiosteal flap replaced and sutured in position after reduction of the mylohyoid ridge.

sues are held in good apposition and healing by primary union will take place in the absence of infection or sloughing. Considerable postoperative pain and delay in healing can occur when the flap becomes detached and loose, exposing the underlying bone. In those cases the wound edges have to be refreshened and sutured back to place.

3556 *Caroline Street.*

Wetting Agents in Metal Casting Processes

J. KENNETH HOLT, L.D.S., D.D.S., Manchester, England

IT WOULD seem that the use of a wetting agent would simplify the production of investment molds for inlays and metal dentures and eliminate the possibility of casting imperfections due to occluded air bubbles on the surface of the wax pattern. Experiments were instituted to determine the most efficient wetting agent for a wax surface.

Requirements of Wetting Agent

1. Should spread evenly over the wax surface.
2. Should not be a solvent for wax.
3. Should not be subject to foaming.
4. Should be miscible with the water-investment mix.
5. Should possess a fairly high boiling point in order to eliminate the possibility of wax pattern warpage due to a rapid cooling effect on its surface.

Use of Turkey Red Oil

Wetting agents and emulsifying agents, regarding their physical properties, are quite similar, and some of the latter disperse easily in water at room temperature. Turkey red oil (sulphonated castor oil) is used widely in industry as an emulsifying agent, and it was felt that this could well be employed as a separating agent when forming wax patterns in dies to produce inlays by an indirect method. This oil was most efficient as a separating medium, but when water-investment was applied directly to the surface, slight foaming was evident, although the fitting surface was well "wetted." The Turkey red oil is miscible with normal propyl alcohol, and this was used with great success as the final wetting agent, perfect casting being produced with a minimum of brushing of water-investment on the wax surface.

Inlays by Indirect Method—1. Apply Turkey red oil to cavity surface of die (Kryptex, amalgam, or copper-plated die).

2. Insert inlay wax and carve to smooth finish.

3. Remove, sprue, and mount on cone.

4. From pipette, apply one or two drops of a 10 per cent solution of Turkey red oil in normal propyl alcohol, and shake off excess. It will be found that the surface is completely "wetted."

5. Mix water-investment and apply with fine brush, when the mixture will form an intimate contact with the wax surface.

Dentures—1. In castings which are made from patterns removed from master models, a technique similar to the forementioned may be followed.

2. In cases where the pattern is made on an investment model, however, only the lingual surface can be "wetted," and easier investing is assured by using the Turkey red oil and normal propyl alcohol solution.

—From Original Communications, *The British Dental Journal* 79:244 (November 2) 1945.

A Critical Analysis of the Factors in the Retention of Dentures

CHARLES H. MOSES, D.D.S., Hamilton, Ontario

The numerous forces and factors involved in the retention of dentures are discussed critically with a view to the proper evaluation of the materials and techniques used in obtaining the desired retention.

IN ORDER that techniques and materials used in taking impressions are properly evaluated, we must understand the laws that govern the retention of a denture in the mouth. First we must study the physics of denture retention. After we understand these laws of physics, we must utilize them in such a manner that they are compatible with the physiologic laws. Today dentistry is beginning to emphasize biology, which is quite different from the mechanical approach to dental problems which has been used in the past. After studying the physical laws involved and relating them to the physiology of the tissues, therefore, it becomes obvious that the materials selected must be chosen with great care so that they harmonize with the technique which will accomplish that objective. This article is intended as a critical discussion of the various factors and forces in denture retention.

Atmospheric Pressure

This is a well known principle that needs but little explanation. If air can be excluded from under the denture base, the 14.7 pounds per square inch of atmospheric pressure present will hold the denture in its place. If the mucous membrane under the denture and in the folds, and the muscles in the cheeks, face, and lips, would remain still; if the tissues would not change because of altered nourishment caused by overcompression or overextension; and if no "sore spots" developed, we should certainly be able to use atmospheric pressure alone for the retention of dentures. Unfortunately, such is not the case, and, therefore, we seldom can count on this force alone. We must employ it wherever possible, however, keeping in mind that the denture must be physiologically tolerable. Let me illustrate by examples the importance of this principle:

1. Select a difficult lower ridge. Overfill a tray with a large wad of compound, insert it into the mouth, and allow it to harden. There will be a positive "suction" in removing this mass from the mouth. Should a denture be processed from this impression, a temporarily snug denture might be obtained, but in a short time several changes would take place:

a) The tissues of the ridge which probably were compressed would straighten out and raise the denture.

b) The mucobuccal fold which was stretched would tend to resume its former position and would raise the denture.

c) The lingual tissues under the

Fig. 1—Fingers of upper hand indicate direction of pull on wet glass slabs. There is considerable adhesion. Adhesion by contact of classes I-A and III-B ridges is illustrated by this experiment.

mucous fold, as well as the fold of the mucous membrane, would act as the labial and buccal membrane did and also would raise the denture.

d) Sore spots would develop.

e) There would be alteration of tissues due to atrophy in some cases; and, depending on vascularity and other factors of nourishment, hypertrophy would develop in other cases.

Although these may be the extreme results in cases of overextension, I have seen many such cases of varying degrees, and have been guilty of making many such dentures myself. It is a common error, and, although the error may be so slight that it is not obvious at first, it soon will become noticeable in the finished denture.

2. We all have had the experience of having a fairly loose upper denture tightened considerably by postdamming. This in itself is an excellent proof that the principle of atmospheric pressure is an important adjunct to the denture technique. The followers of the so-called "mucostatic" method, which minimizes the importance of atmospheric pressure in the retention of dentures, should bear this in mind.

3. I have often been assured success in the construction of an upper denture by filling in the hollow of the buccal area in the posterior of the vestibule of the mouth, at the "corner" of the heel. The addition of a bit of compound in that area alone often means all the difference between a snug and a loose denture. By this method an air vent is merely closed, permitting atmospheric pressure to operate.

4. Some patients have lips that are so short that they curl up above the periphery. One such patient presented herself to me. Merely by instructing the patient to slightly lower the upper lip, which she had a habit of curling up, I was able to convince her that the denture was really quite tight. She had no difficulty following correction of this habit, which was an abnormal one for her. The case is, however, an excellent illustration of the force that can be obtained by the proper utilization of the principle of atmospheric pressure.

Fig. 2—Fingers of upper hand indicate direction of pull. Slabs slide but cling. Adhesion of classes I-A, III-A, and III-B ridges is illustrated. Wherever some walls are parallel, separation is resisted. Length of parallel walls and broadness of crests have direct bearing on retention of lower dentures.

Adhesion by Contact

Although the term "surface tension" has been used frequently here by me, and by Page, who rediscovered the mucostatic principle of retention,[1] I know of no better phrase that describes this principle of retention than "adhesion by contact." This phrase was originated, as far as I know, by G. H. Wilson.[2] Although Wilson's book was written in 1917, I have not seen a better description of the nature of this force in any more recent literature. None of the newer terms conveys more meaning; they are, in fact, likely to be more confusing. The term "adhesion by contact" will be used here, and an analysis of just what this force does and why it is essential for the retention of dentures will be made. The following are simple and obvious experiments to illustrate the forementioned:

First Experiment—Wet two smooth glass slabs, place them together, and try to pull them apart (Fig. 1). They resist separation. If the denture base would touch the mucous membrane as accurately as the glass slabs touch each other, with the saliva remaining thin, and all the force tending to separate the denture base from the mucous membrane at right angles, our troubles would be over so far as impressions are concerned. Unfortunately, however, the living tissues refuse to act as do the predictable glass slabs. We have not reached the stage where we can predict the accurate contact between the denture base and the

[1]Year Book of Dentistry, 1944, page 473.
[2]Wilson, G. H.: A Manual of Dental Prosthetics, ed. 3, Philadelphia, Lea & Febiger, 1917, pages 301 and 308.

Fig. 3—Fingers of upper hand indicate direction of pull. Less force is required to separate glass slabs when they are held at a tilt. Adhesion of class II ridge is illustrated.

tissue. There are too many interfering variables. The surface of the denture base may be made constant and stationary, but the surface of the mucous membrane cannot be held so constant. One reason for this is that the mucobuccal and the mucolingual folds often are attached high onto the ridge, and any movement of the lips, cheeks, or tongue will move the mucous membrane and alter the relationship of it to the denture base. Incidentally, the mucostatic impression technique, which will be mentioned rather frequently, makes much of its claim that it obtains uniform contact and maintains it because the impression is taken when the tissues are in a relaxed state and with a minimum amount of pressure upon the tissues, creating, thereby, an impression with no distortion. That is only one phase of the technique, but it is to be noted here that this contact cannot be maintained permanently.

A mechanical consideration is that during the various functions the pressure is not always at right angles. The more angular the direction of force, the more likely the separation of the membrane from the denture at the periphery. Another mechanical and important consideration is that on a lower ridge we may have many densities under the mucous membrane. The ridge may be soft and flabby, or it may be flabby but not quite so soft. The mucous membrane may be thin with little resilience and a sharp, bony prominence underneath; or the membrane may be thickened and resilient, neither thick nor thin. There will constantly be different responses of the *submucous* tissues to pressure.

The proponents of the mucostatic technique refer to Pascal's law. They point out that tissues are composed chiefly of water, and according to Pascal's law the pressure exerted on water is equally distributed in all directions. They go further and state that if the tissues fit the denture base completely and are not displaced while the impression is being taken, there can be no movement of the denture base because the part that is enclosed by the denture base virtually acts as a solid. This statement is incorrect in the following respects:

1. Although it is true that tissue cannot be compressed if it is confined in a steel cylinder with only one free end which is soon closed by a tight-fitting steel plunger, there *are* free ends to a denture. There is an entire and lengthy periphery, and some tissue can escape from beneath this periphery while the denture is under pressure. A denture base is not a completely enclosed cylinder.

2. The bone, vessels, and other tissue under the denture, are part of a system that permits the flow and escape of serous matter. A good example is that of an old woman who quickly treats a "bump" on the head, raised through some accident, by pressing the flat of a knife on the "bump" until it disappears. There usually is no swelling after that. Certainly the fluid that rushed into the "bump" seemed to come and go quite easily. A denture base subject to pressure in one spot should be able to press some of the ridge contents down into the submucous structures just as in the example mentioned. With a properly constructed denture, one should be able to exert considerable pressure. Inasmuch as this pressure is to a great extent distributed in all directions in accordance with Pascal's law, one of the directions can be in that of the submucous tissues.

3. Tissue is not water alone, as in the mechanical sense. There are factors that will alter the shape of tissues because of either excessive or insufficient pressures. If an area is overcompressed, as results in traumatogenic occlusion, for some length of time, it could resorb. According to the advocates of the mucostatic technique, who repudiate the utilization of atmospheric pressure and depend on uniform contact alone, alteration of the tissue surface will affect the fit adversely. Tissues, both soft and hard, alter under the pressure of a denture after a period of time. The bone alters its structures so that the lines of force, in accordance with Wolff's law, become rearranged. The soft tissues also become altered.

In Nature's attempt to adjust, tissues change considerably. It is well

known to all dentists that hard areas should be relieved sufficiently; otherwise dentures begin to "ride" these areas. This is explained generally by the term "settling" of the denture. What actually has taken place is that there has been a readjustment of the tissues affected by the denture, which caused such a reorganization that the denture no longer touches exactly in the original places. Do the mucostatic impressions prevent these alterations? If they do not, their fit will be altered adversely because other aids are not taken advantage of in that technique. One of these is "atmospheric pressure," which could work in conjunction with "adhesion by contact."

On returning to the experiment with the glass slabs, we notice that the mouth does not react as simply as do the slabs. Nevertheless we must utilize the principle and attempt to combat, in the best manner possible, difficulties as they arise. We must note, however, that if the contacting surfaces of the slabs are uneven, there will be less resistance to separation at right angles; therefore, the more accurate the contact is, the greater will be the retention of the denture. The impression should strive to obtain this contact under most conditions.

Second Experiment—Slide one wet slab upon the other, attempting to pull them apart (Fig. 2). It will be observed that they cling together, resisting separation, but that they slide rather easily on one another. From this we learn that although the denture base will slide at an angle parallel to the contacting surface, it will hug that surface. This is of great importance, because, if the walls of the ridge are parallel and the denture base hugs them as it is displaced upward, a partial vacuum is created at the crest of the ridge and resists separation. This is a distinct advantage. If the walls are not parallel and converge into a V, contact is broken immediately on upward displacement, a space having been created between the entire ridge and the base (Fig. 3).

Third Experiment—If one of the slabs is broken in half, only half of the force will be required to separate them. We can note, therefore, that the greater the contacting area, the greater will be the force required to displace the slabs at right angles. Thus, we should strive for the greatest amount of coverage and yet should not overextend the denture.

Fig. 4—Class I-A: Inverted U-shaped ridge. Excellent retention.

Fig. 5—Class I-B: Flat U-shaped ridge. Dotted line indicates new levels of same ridge. Note reduction in area of surface and consequent reduction in adhesive retention; also gradual loss of parallel walls.

Fig. 6—Class I-C: U-shaped ridge. This was originally a class I-A ridge.

Fig. 7—Class II: V-shaped ridge. Least retention. Contact at periphery and crest is broken quickly, leaving entire surface of denture without contact.

Fig. 8—Class III-A: Parallel-walled, thin ridge. Walls parallel but crest too small to contribute more than a little retention.

Fig. 9—Class III-B: Parallel-walled, broad-crested ridge. Approaches a combination of classes I-A and III-A ridges. The most retentive ridge.

Shapes of Ridges

In a previous article,[3] I classified the shapes and density of the ridges of the mandible. Inasmuch as similar laws also apply to the maxilla, the mandibular classification will be repeated here. With a knowledge of this classification, I believe, and have verified on many occasions, that the *degree* of "suction" with which the denture will cling to the mandible can be prognosticated in every case. We can, therefore, know what to promise the patient. This is a great advantage when discussing with the patient just what he may expect from his new dentures.

Class I-A — Inverted U-Shaped Ridge: This is not a high ridge, but the short side walls are parallel (Fig. 4). This ridge has excellent retention for two reasons:

1. The walls being parallel, and the displacement being upward, a vacuum is created at the crest.

2. The broad crest resembles the flat slabs and resists separation between the denture base and the mucous membrane. I have seen extremely snug lower dentures constructed on such ridges.

Class I-B—Flat U-Shaped Ridge: This is the U-shaped ridge at a lower level (Fig. 5). The parallel walls are lost and most of the adhesion of the denture is lost with them. In an article describing the mucostatic impression, Levy[4] claims that the walls have no bearing on retention. He claims that "the only value of the flanges is to prevent lateral movement," and draws a figure of a squared, inverted U. I have proved that where there are parallel walls there is a "suction" in varying degrees, depending on the broadness of the crest of the ridge and the height

[3]Moses, C. H.: The Physics of Denture Retention, J. Ontario D. A. (February) 1944.
[4]Levy, Saul: Science Versus Technique in Taking a Full Lower Impression, THE DENTAL DIGEST 50:440-444 (August) 1945.

Fig. 10—The new dentures (left) cover a larger area than do the old ones (right), resulting in better adhesion. The greater surface coverage likewise lessens trauma and irritation.

of the wall. Certainly one of the illustrations, Figure 7C, in Doctor Levy's article typifies a ridge with a great deal of "suction" because of the paralleled walls, or flanges, as he calls them. ("Suction" is used in quotation marks here because it is the accepted term among dentists although not an accurate descriptive term.)

Thus we see that in the flat ridge a slight adhesion will be obtained, but not a great amount, because the walls have been lost. The lingual flange will prevent some lateral slide.

Class I-C—U-Shaped Ridge: This is the ridge resorbed to form a hollow or U shape (Fig. 6). Not much retention can be expected because the denture slides around like one saucer within another.

Class II — Inverted V-Shaped Ridge: With the ridges of a V shape (Fig. 7), the denture base separates from the mucous membrane with the slightest force. It breaks contact in its entirety due to the shape of the ridge. It provides poor retention regardless of the height of the ridge. It is generally found where posteriors have been extracted for some years.

Class III-A—Parallel-Walled, Thin Ridge: These ridges have long walls but an extremely thin crest (Fig. 8). They do not have a great amount of "suction" because of the narrow area on the crest.

Class III - B — Parallel - Walled, Broad-Crested Ridge: This has the greatest retentive force of all the ridges (Fig. 9). Long, parallel walls and a broad crest are the best combination one can desire for the retention of a denture. The patient may be promised a tight denture.

Class IV—Flabby Ridge: This classification has been made because none of the forementioned rules regarding the shape of the ridges can be applied if the ridges are flabby. The contact with the denture base is unpredictable despite the claims of the advocates of the mucostatic impression technique, because the ridges *do* compress and the tissue does flow from beneath the periphery. Doctor Levy attempted to determine and compensate for the resiliency of these tissues in his impression technique.[4]

Class V—This is a combination of any two or more of the forementioned types. The classification is made to permit an evaluation of the degree of retention of that particular lower denture. For example, if the lower six anterior teeth have been extracted recently, and results in a Class III, thin, parallel-walled ridge, a great amount of retention can be expected in that area. If, however, the posterior teeth had been extracted for some time and the ridges are of a Class I, flat type, much of the suction will be deleted, but it is still possible to prognosticate a fairly snug denture with a fair amount of suction. The anterior ridge is a great help in this case, compensating for the loss of suction caused by the poor posterior ridge.

Occlusion as a Retentive Factor

Poor occlusion can disturb the dentures in several ways:

1. Traumatogenic occlusion as a result of poor balancing naturally will cause both displacement of the dentures when they are rubbed together and alteration of the tissues under the dentures. Both are disturbing factors, altering the fit.

2. Cusped teeth often will cause the dentures to shift on their bases, the inevitable alteration of the vertical dimension causing the inclined planes to meet in new contacts. Flat cusped

teeth do not do this as readily, and should, therefore, be employed wherever possible.

3. A good occlusion with uniform contact in the many positions is an aid in the maintenance of a uniform contact between the denture base and the mucous membrane.

How the Various Factors Affect the Retention of a Denture

The following are some of the important factors to be considered for retaining a denture efficiently and for a long time:

Atmospheric Pressure—This force supplements adhesion by contact, and stabilizes the denture when the adhesion by contact is momentarily lost.

Adhesion by Contact—This is a force that is independent of atmospheric pressure for retention. It is, however, constantly in danger of being disturbed through changes that take place both on the surface tissues and in the tissues under the surface.

Occlusion—Teeth should be so arranged that in the majority of positions the pressures from the teeth should be distributed evenly. Excessive pressure also should be prevented in single areas because that would cause altered tissue formation.

Prevention of Overextension — An overextended denture will injure the peripheral tissues, causing them to change. The overextended tissue also will tend to return to its normal position, displacing the denture.

Coverage of Largest Area Possible —While it is true that overextension is harmful, one must extend the dentures to the maximum degree. As has been pointed out, the more area covered, the greater is the adhesion. This also will tend to reduce tissue irritation under the denture because of the greater distribution of the load. A good comparison is walking on soft snow with snow shoes rather than with regular shoes (Fig. 10).

Prevention of Peripheral Overcompression—In former years the practice of scraping a bead at the periphery was quite extensive. Its purpose was to "valve seal" the denture. This caused an interference with the circulation, and ultimately caused the resorption of tissue due to lack of nourishment. This meant, of course, a looser denture.

Prevention of Compression of Ridge Tissues—The impression technique must not alter the shape of, or overcompress, any part of the ridge. The tendency of the ridges to resume their former position will lift the denture and break contact, causing a loose denture. The action is like that of putting an elastic band between two glass slabs. The mucostatic technique bases its entire theory upon this one point.

Chemistry of the Tissues—The tissues under dentures will be altered just as much as will the tissues in dentulous mouths if the cause is a systemic alteration in the chemistry of bodily tissues. For example, a lack of vitamin C may produce a tender and inflamed mucous membrane just as it will produce a typical gingival inflammatory condition when the teeth are present. Patients who have various diseases, such as diabetes, cardiac ailments, and hypertension, which have to do with either the quantity or the quality of nourishment to the tissues, often present mucous membranes that not only are injured easily, but, because of the slowness of repair, often cause the ultimate fit of the dentures to be altered. Wilson has pointed out that dentures become loose when the patient is fatigued.[2]

Surgery—A good exodontist will leave the ridges high and parallel wherever possible or advisable. Surgery can become a major factor in the retention of dentures. Flabby tissues should be treated surgically wherever possible. Undercuts should be eliminated because they are a detriment rather than an aid.

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Technique for the Replacement of Broken Anterior Bridge Facings

Lieutenant Commander HARRY E. DENEN (DC) USNR, Corpus Christi, Texas

The various types of breakage of anterior bridge facings are listed, and a simplified technique for the repair of such broken facings is presented.

THE REPLACEMENT of broken anterior bridge facings, a necessary repair for obvious reasons (morale, safety, hygiene), is a procedure constantly required of Navy Dental Corps officers. To make these repairs necessitates a constant supply of shades and molds of facings. Not only is this impossible, but, because of the personal equation which enters into the construction of each bridge, not many facings can be refitted accurately. For these reasons, the technique described here was developed for the replacement of facings on bridges with Steele's or similar backings.

A facing can be replaced, when an acrylic replacement is made, by utilizing, in most cases, teeth out of denture sets which have been broken up to construct partial dentures and from which only a few teeth have been used.

Types of Breakage

1. Figure 1 presents the usual type of breakage, with the missing anterior facing.

2. The most annoying breakage is that in which the backing and facing have been ground to accommodate a peculiar space, where it may be necessary to grind either the mesial or distal of the facing until it is thin.

3. There is also the type of breakage in which the bite is short and the facing has been shortened, leaving a stubby facing and virtually no backing lug. The patient invariably will testify that the facing has been replaced many times.

4. A fourth type is that in which

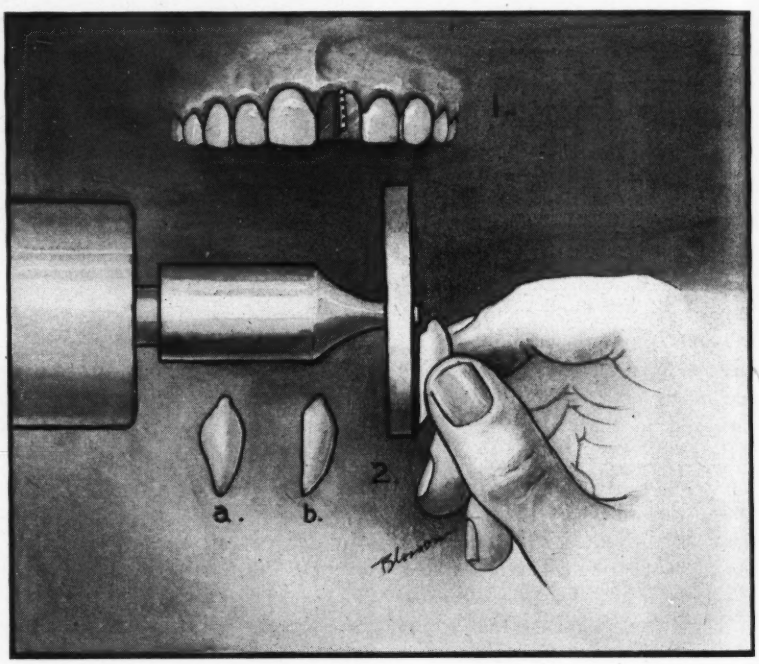

Fig. 1—Above: Most common type of break in a bridge, with missing anterior facing. Below: An acrylic tooth (a) is ground on a lathe into the form of a replaceable facing (b).

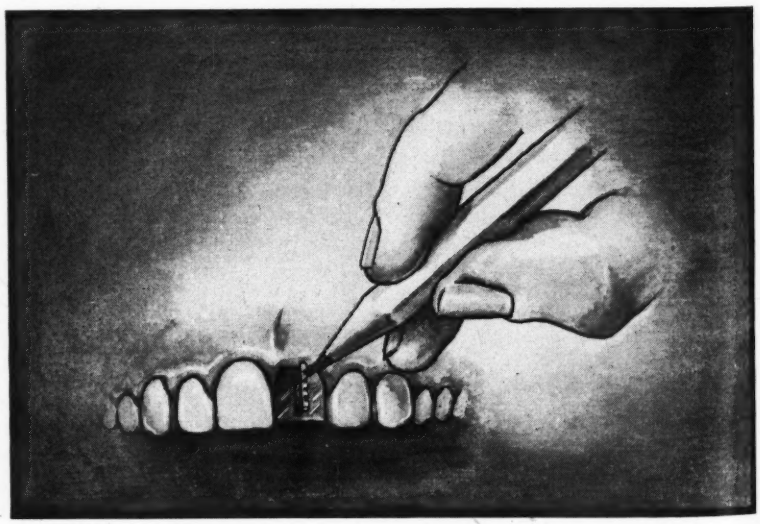

Fig. 2—After the backing is clean and smooth, the retention lug is rubbed with a soft lead pencil.

there is an end-to-end bite, where the incisal metal has been worn thin, with subsequent fracture of the facing, but where the bridge may still be doing good service.

Technique for Repair

1. An acrylic tooth (a in Fig. 1) is laid on the flat surface of a carborundum stone on a lathe, and is ground into the shape of a replaceable facing (b in Fig. 1).

2. After all the old cement has been removed and the frayed incisal edge of the backing is smoothed, the retention lug is rubbed with a soft lead pencil (Fig. 2).

3. The inner surface of the prepared acrylic facing then is rubbed on the retention lug (Fig. 3). This marks the surface of the facing with lead so that the necessary slot can be cut to fit the lug.

4. With a number 700 crosscut fissure bur a cut is made sufficiently deep on the marking to allow for a fitting of the facing (Fig. 4). The bur is pulled slightly mesially and distally to undercut the slot. Ease of grinding acrylic is quite evident, so care must be exercised that too much of the facing is not ground.

5. After the facing has been fitted, the bur again is placed in the slot and is countersunk toward the incisal so that the lug can be engaged. If the facing is long and there is a danger that the reduced length may bring the end of the slot too near the incisal edge, reduce the size of the lug by cutting into the backing and by cutting the lug off so that the retention aspect will remain the same. This will permit the facing to go up a little higher on the backing without endangering its incisal edge.

6. The facing then can be shaped in any manner desired because it is possible to polish the surfaces of acrylic, a procedure which, as is well known, is impossible with porcelain on which the glaze cannot be restored.

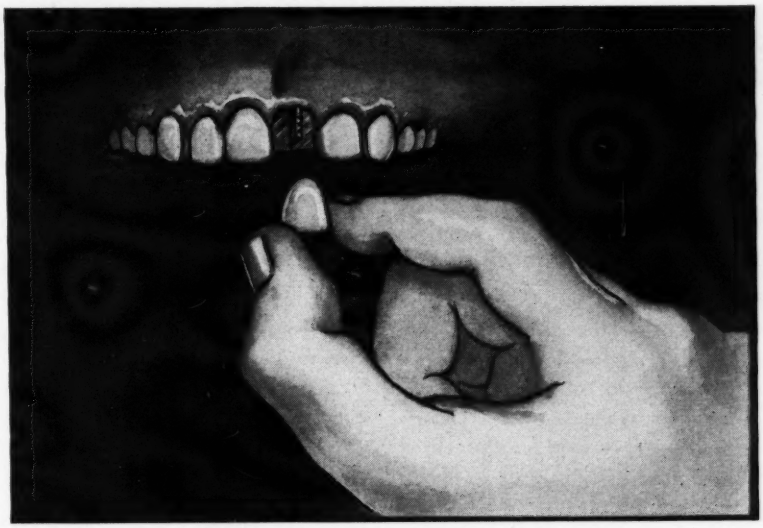

Fig. 3—The acrylic facing is rubbed on the pencilled backing to indicate where the slot should be cut in the facing to fit the lug.

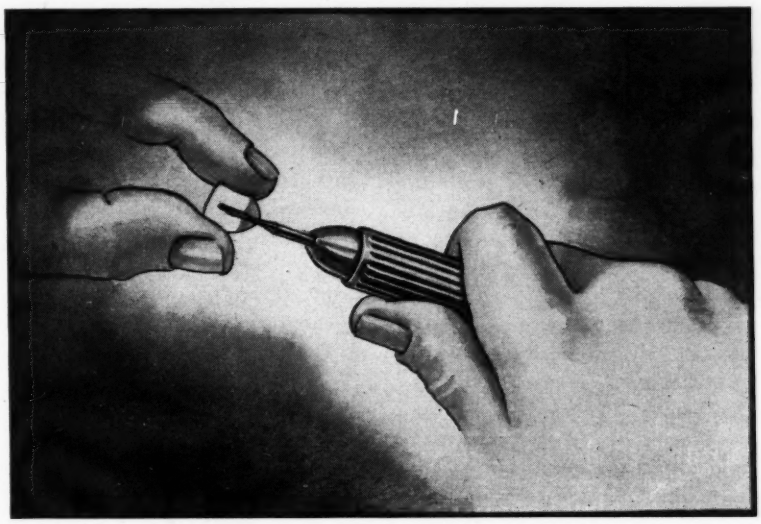

Fig. 4—A number 700 crosscut fissure bur is used to cut the slot in the facing to fit the retention lug in the backing.

7. For further protection of the facing, particularly in those cases in which the facings have been fractured several times, the facing is shortened about ½ millimeter along a slight edge of the backing to show at the incisal edge. When the facing is cemented, the backing then can be disced and burnished so that the incisal edge will be protected.

Treatment of Hydrocephalus by Prosthesis

FRED A. SLACK, JR., D.D.S., Philadelphia

Innumerable treatments have been suggested and attempted for hydrocephalus in infancy, which, according to Dorland, is "a condition characterized by abnormal increase in the amount of cerebral fluid accompanied by dilatation of the cerebral ventricles . . . marked by enlargement of the head." The treatment described here, the application of a methylmethacrylate cap to the infant's head, to remain in place until the rest of the body corresponds in size with that of the head, is that used in one case of hydrocephalus. The presentation is a single case report and is not intended to represent a general principle of therapy.

CECIL[1] DESCRIBES hydrocephalus as follows: "Hydrocephalus, sometimes present at birth, is characterized by abnormal enlargement of the head and dilatation of the ventricles of the brain at the expense of the brain substance which, as a rule, is flattened into thin sheets surrounding the ventricles. It is usually internal and bilateral, but occasionally the ventricular distention is restricted to one lateral ventricle as the result of either a developmental anomaly of the brain or of some lesion in the ventricular walls. External hydrocephalus is a condition characterized by accumulation of fluid in the distended subarachnoid space over the surface of the brain, and by atrophy or shrinking of the brain substance. . . . The congenital form is frequently caused by total or partial obstruction of the aqueduct of Sylvius; this prevents circulation of the cerebrospinal fluid from its point of formation in the choroid plexuses of the lateral and third ventricles to the fourth ventricle, and thence to the subarachnoid space through the foramina of Magendie and Luschka. When normal absorption of the fluid in the subarachnoid space is thus prevented, its accumulation in the lateral and third ventricles produces obstructive internal hydrocephalus."

The treatment described in the following case report is not intended to represent a general principle of therapy. It is a treatment that was instituted in this single case after other advocated methods were not consented to by the parents of the infant. Surgical treatment and dehydration were rejected by the parents. Iodine therapy had been instituted for obscure reasons by a general physician.

History

Parental—The parents were normal except for the smallness of the mother. Neither parent had hereditary anamolies. The previous birth of a son had been difficult but normal, and the mother had subsequent repair operations.

Birth—It was anticipated that the birth of this child, the second, would be by Cesarean section, but birth occurred prematurally, at seven months, leaving no such opportunity. The birth was difficult but there was no apparent injury to the male infant.

Infancy—The premature infant thrived and until the fourth month seemed entirely normal. During the fourth month enlargement of the head was noticed; however, this was not excessive. During the fifth month there were noticeable increases in the size of the head. The condition was diagnosed as hydrocephalus by three specialists as well as by general physicians and pediatricians.

Treatment Suggested

The treatment of the hydrocephalus by prosthesis was suggested because it is known that the shape of the head can be altered by mechanical means. Certain African tribes and American Indians are known to have deformed the skull by applying pressure by means of tape, wires, wood, and other appliances. The skull often is elongated, flattened, and misshaped in other ways, but apparently the mentality is not lowered beyond that of other similar though normal-headed persons. It was theorized that the procedure should be greatly facilitated and its ill effects minimized if it were carried out during the development of the bones of the skull.

The plan was to construct a rigid plastic headcap which would fit from the brow to the top of the neck and from ear to ear. The cap would be split from ear to ear and attached to place on the infant's head by means of three bolts which would join the halves. This cap would be placed on the infant's head and allowed to remain there until the size of the body corresponded with the size of the head.

The theory was that if there were a stoppage, complete or incomplete, between the ventricles and the spinal cavity, the pressure of the fluid would be exerted against that constriction rather than toward the bones of the skull. It was intended to let Nature take a natural course. If no communication existed to the spinal cavity, perhaps an unnatural opening would be effected which would become permanent. If no opening were effected,

[1]Cecil, R. L.: A Textbook of Medicine, ed. 4, Philadelphia, W. B. Saunders Company, 1938, pages 1368 and 1369.

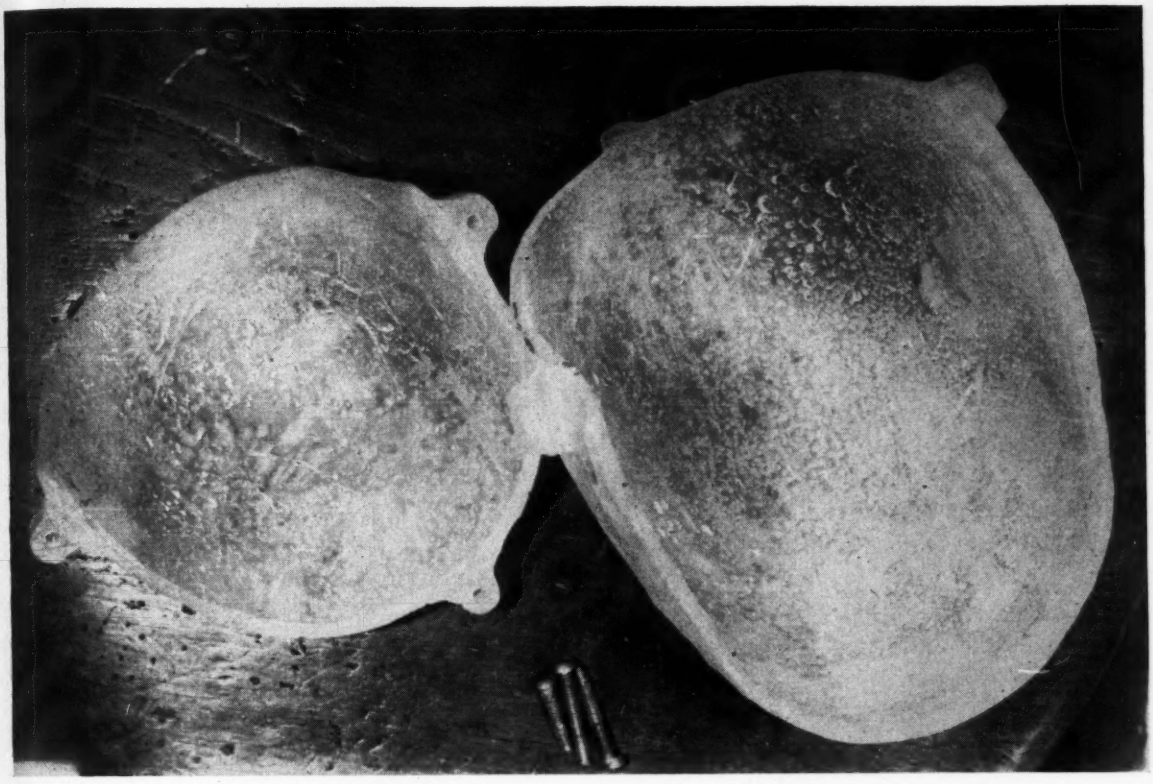

Fig. 1—Two-piece methylmethacrylate headcap used in treatment of hydrocephalus.

discomfort would cause cries which would indicate removal of the cap. It was felt that any harm resulting from the headcap would be no worse than the resulting permanent defect of the hydrocephalus itself.

Treatment Procedure

1. The parents' consent and that of the general physician in charge were obtained, and we had the advice of the pediatrician.

2. It was first necessary to secure a tray adequately large for taking an impression of the head. This was constructed of wire-reinforced plaster of paris and was made in two sections to allow for existing undercuts.

3. The impression was taken with hydrocolloid impression material, and a stone model was poured. The headcap was waxed up ¼ inch thick with the bolts in place.

4. A flask then was constructed of a wooden box, and the headcap was invested. Clear methylmethacrylate was used in processing the headcap, but no attempt was made to obtain clarity in the cap because of the poor flasking method. The illustrations show the finished cap assembled and in its separate parts.

5. For a month previous to suggestion of this treatment and during the two weeks of construction of the cap, measurements of the circumference of the baby's head were made. The head was enlarging at the rate of ½ inch in circumference per week. At the time the headcap was first applied, the diameter of the head measured seventeen inches.

6. When the headcap was completed it was screwed shut on the baby's head after powder was first applied to the head. The bolts could not be tightened completely because of the increase in the size of the head that had taken place while the headcap was being made. The bolts were tightened little by little, however, and by the end of the third day the cap completely enclosed the baby's head. No discomfort was apparent and the baby seemed entirely happy.

7. At the end of the first week the cap was removed at the direction of the physician. The head was measured, bathed, and powdered. No irritation was apparent. The cap was replaced immediately. Although the cap had been off less than one hour, it could not be closed completely; therefore, the bolts could not be tightened completely.

8. The cap then remained on the infant's head for four weeks. During this time no apparent irritation was expressed by the child and he seemed perfectly happy.

9. Again on removal of the headcap, measurements of the head were taken and it was found that only a slight increase in size had occurred. This increase might have been due in part to the relief given the tissues surrounding the skull. Against our wishes the physician advised leaving the cap off for twenty-four hours for observation. During this time there was an increase in the circumference of the skull of nearly ½ inch. The cap could not be replaced without discomfort, so we immediately set about making new impressions and constructing a new cap. This took

Fig. 2—Methylmethacrylate headcap, halves attached, as they are used in treatment.

almost a week, during which time the skull increased rapidly in circumference, totalling an increase of ½ inch. On putting on the new headcap, however, an apparent reduction in circumference occurred; whether this was in the soft tissues or in the bone is not known.

10. The cap was closed completely in a few days, and again remained in place for four weeks. During this time the infant's body was increasing in size. The cap remained on for another month. The child seemed perfectly happy all the while.

11. The child was kept in the parents' home during the treatment. Neighborly gossip and the necessity of explaining the child's condition to friends caused great embarrassment to the mother. Soon after the ninth week of treatment she removed the headcap without advice and would not permit its being replaced. The cap had not remained in position quite long enough to allow the child's body to grow to correspond with the size of his head. Thereafter growth continued in a somewhat normal manner.

Conclusions

Although studies and measurements could not be continued after the final removal of the cap, the following conclusions may be stated:

1. The child's head is not enlarged to a point of embarrassment to the mother nor beyond that of a normally "large" head.

2. Abnormal growth of the head apparently has ceased.

3. The external fontanel has closed completely.

4. The child was spared surgery which, in virtually all instances has not resulted in "cure."

5. No harm apparently has been done to the child either mentally or physically. He has been examined by child psychiatrists. He is now four years of age.

6. It has been indicated that growth of the cranium can be arrested by prosthetic means without subsequent harm and with probable normal or abnormal opening of the communication to the spinal cavity. It is thought by those in attendance that had the cap remained in place until the body grew to a size to correspond with the head, and that if the procedure had necessarily been repeated, the child's head would be entirely normal in size.

7. There is always the possibility in a case of this kind that the child underwent a natural change which was responsible for the result and which the treatment did not bring on nor help.

32*nd and Spring Garden Streets.*

The Editor's Page

"RADIATION SICKNESS" is the name of the condition that affected the inhabitants of Hiroshima and Nagasaki after the release of the atomic bombs on August 6 and 9, 1945. The immediate death toll among the inhabitants was high. Radiation sickness is a condition that results from the release of radiant energy and sets up a chain of bodily events that may lead to death or periods of subacute or chronic illness.

Slightly over a month after the blast at Nagasaki, a United States Navy medical mission visited the area and examined the survivors.[1] The principle effect of the radiation was on the bone marrow, with depression of the blood-forming function of the marrow. The blood was found to be deficient in red blood cells and in hemoglobin. A marked reduction in the white blood cell count also was observed. With such destruction in blood cells, it is no wonder that many persons who survived the initial blast died later from terminal infections, notably bronchopneumonia. Of particular interest to dentists is the report of the dental officer attached to the medical mission:

"The oral changes consisted of a glossy, smooth tongue, with ulcerative lesions of the mucous membranes. The ulcers were composed of necrotic areas with a complete clinical absence of a surrounding inflammatory zone. The lesions bled easily, were often grossly infected, and showed no tendency to heal. Two cases of necrosis of the mandible were seen and one case of noma with ulceration of the lips and necrosis of the mandible and maxilla. The teeth were generally loose and easily removed by hand. It was found that the teeth were loosened in the following progressive order: upper anterior, upper posterior, followed by the lowers. It also was found that the gingiva was slightly hypertrophied and the looseness of the teeth was due to destruction of the alveolar bone and periodontal membrane. A few of the cases showed excessive salivation. Some of the gold removed from the teeth of these victims contained radiant energy."

The Nagasaki medical report, and most others that have been made to date, stressed the destructive powers in nuclear fission. However, one physicist, James Franck, the Nobel Prize winner, now of the University of Chicago, believes that there are beneficial potentials from the release of atomic energy. He states the constructive aspects in these words:[2]

"The destructive power of the radiations is easy to understand. When these radiations are absorbed by matter, their energy is taken up by the loosely bound electrons responsible for the structure of chemical compounds. Thus, the radiation from a single disintegrating nucleus is sufficient to change the structure of hundreds of thousands of molecules. This process plays havoc with the delicately balanced chemistry of living tissues.

"The radiations produced by fission, though dangerous, may nevertheless prove to be the most important gift of the new scientific development. A knife can be used not only to kill but to cure. The radiations from radium and x-rays are also dangerous, but the miraculous results achieved by using them against cancer are well known. Atomic power plants provide the means of magnifying and possibly of multiplying many times such applications in the treatment of disease."

It is desirable that before the large-scale atomic demonstrations scheduled to begin in the Pacific in May of this year are begun the military authorities will plan for comprehensive biologic observations and tests. It has been reported that laboratory animals will be placed on some of the ships that are to undergo atomic bomb attack. Inasmuch as the Nagasaki report emphasizes the oral lesions demonstrated in radiation sickness, we are hopeful that competent dental biologists and pathologists will be among the invited scientific observers.

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[1]Timmes, J. J.: Radiation Sickness in Nagasaki, Preliminary Report, U. S. N. Med. Bull. **46**:219-224 (February) 1946.

[2]Franck, James: Medical Benefits from Atomic Energy, Radio talk in series on The Atomic Age, December 16, 1945.

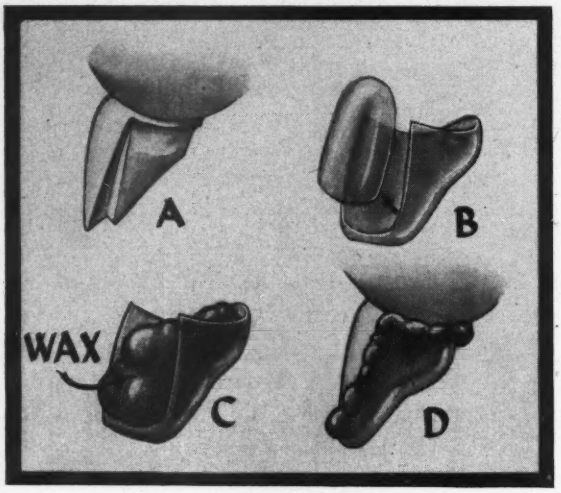

Fig. 1

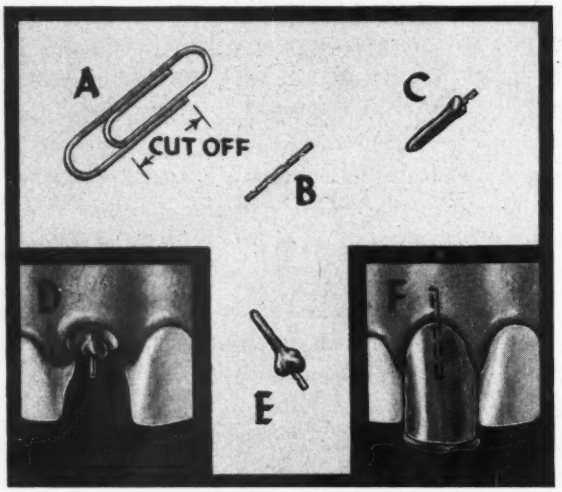

Fig. 2

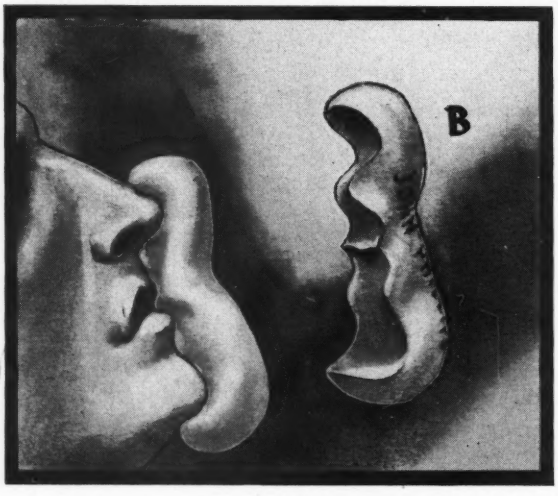

Fig. 3

A Celluloid Crown Form for Making Wax Patterns for Three-Quarter Preparations

Lieutenant (jg) Frederick A. Zulch (DC) USNR, San Francisco

Fig. 1—A three-quarter preparation is made with a definite gingival shoulder (A). Select a celluloid crown form of approximately the size and shape of the tooth. Cut away the labial part of the celluloid form and contour the gingival part (B). Lubricate the tooth preparation and the crown form. Place soft wax in the form (C), and carry to position over the tooth preparation with firm pressure (D). Trim the excess wax from the margins of the form. Remove the celluloid, and contour and carve the pattern to the proper form.

An Accurate Impression for a Post in an Anterior Tooth

George Ross, D.D.S., Jackson Heights, Long Island

Fig. 2—Cut a piece off a paper clip (A), and notch this small metal post (B) with a disc. Heat the notched post to a cherry red, add melted compound (C), and force into the root canal (D). Remove before the compound becomes hard (E), and then replace it in the root canal. With the post in position, take a band impression of the root stump. An accurate casting can be made from a model made from this impression.

A Pre-Extraction Profile Record

B. C. Trexler, D.D.S., Charleston, Illinois

Fig. 3—With the patient in a reclining position in the dental chair and the teeth in centric occlusion, a roll of quick-setting plaster about 1 inch in diameter and 6 or 7 inches long is placed over the tip of the nose and molded over the lips and chin (A). Care must be taken that the plaster does not interfere with normal nasal breathing. The plaster is removed in 1½ minutes, and the patient's name is inscribed on it with indelible pencil (B). This plaster guide is used to ensure proper vertical dimension and facial contour in constructing dentures.

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You do not have to write an article. Furnish us with rough drawings or sketches, from which we will make suitable illustrations: write a brief description of the

...UGGESTIONS . . . .

A Method of Boxing Full Impressions

D. C. De Arment, D.D.S., North Baltimore, Ohio

Fig. 4—The soft metal tube that holds alginate powder is used (A). This metal container is split open and strips are cut from it (B). A wax strip, ¼ inch wide, is placed around the impression (C), and to this is attached the soft metal stripping, which will confine the model material when the cast is poured.

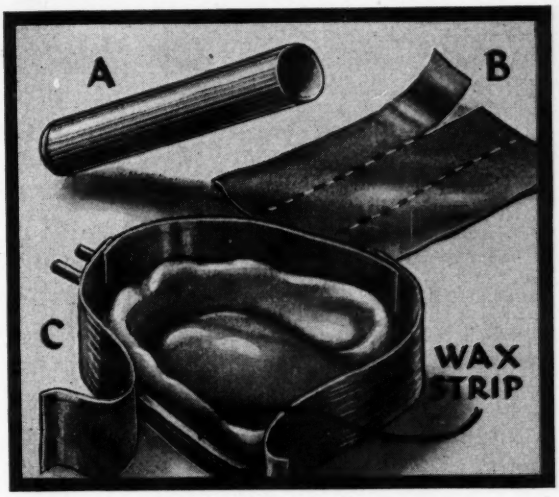

Fig. 4

Individual Sterile Dressings for Surgery or Root Canal Therapy

Maurice Malsky, D.D.S., New York

Fig. 5—Remove the rubber stoppers from the ends of a glass anesthetic cartridge, and plug one end of the cartridge tightly with cotton. Absorbent points, dressings, drains, pellets, or other materials, are then inserted into the cartridge, and the other end is plugged with cotton. This container is then placed in the autoclave to sterilize the contents of the tube.

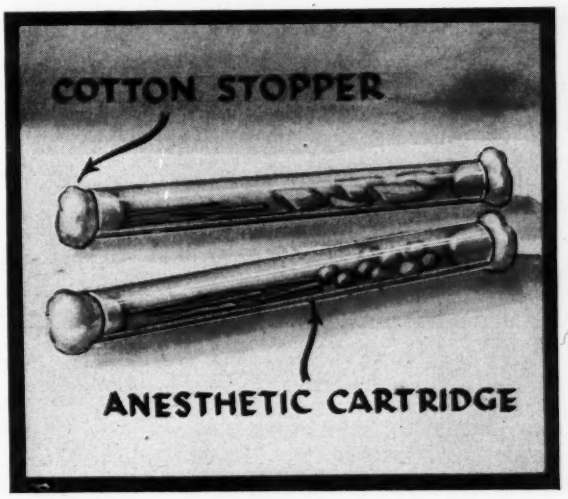

Fig. 5

Cement Linings for Deep Cavities

Major J. N. Dore (CDC), Camp Borden, Ontario

Fig. 6—After the cavity has been prepared, a copper band is contoured to fit the tooth (A), and a modeling compound impression is taken. Using a sharp knife, the compound is trimmed where the cement is to be placed (B). Lubricate the compound with cocoa butter. Place cement in the cavity and press the band to place (C). After the cement has set, the band is removed. The metal restoration is subsequently placed upon the cement base.

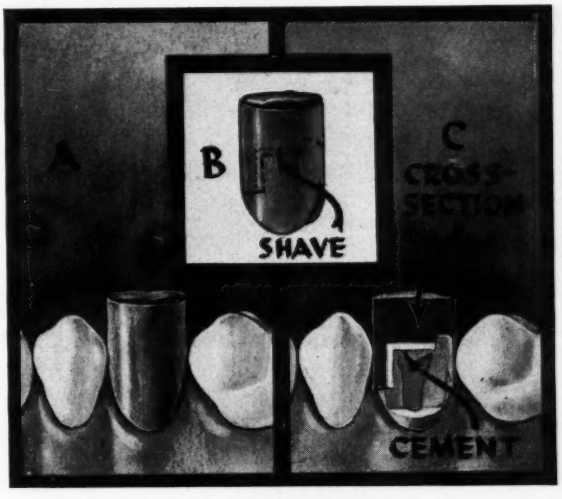

Fig. 6

technique involved; and jot down the advantages of the technique. This shouldn't take ten minutes of your time.

Turn to page 152 for a convenient form to use.

Send your ideas to: Clinical and Laboratory Suggestions Editor, THE DENTAL DIGEST, 708 Church Street, Evanston, Illinois.

Contra-Angles

Reports on a Dental Meeting . . .

Not so many years ago a dental meeting gave the newspapers the chance to set up the headlines "Tooth Carpenters in Conference" or "Tooth Pluggers Meet to Talk Shop." The stories that were written under these headings were nearly always inaccurate and breezy, and put dentistry in a bad light. The public was given no information from such stories and the profession gained no esteem. This kind of slanting may have been in part a fault of dentists. When a meeting was held, no provision was made for the press and no one was appointed to help reporters get their stories straight. In fact, frequently the reporter was barred from the sessions and was given to feel that he was an unwanted gate crasher. He was assigned by his editor to get a story. If he could not be aided by dental society officials, he had nothing to do but get the story in his own way. Often it was necessary for him to put his imagination to work. The reporter often was annoyed with the cold reception and consequently slanted his story unfavorably. The stories written under such conditions were bad from everybody's standpoint.

The day when dentists realized that they were not experts in public relations and publicity techniques and placed their affairs in the hands of trained people, the stories appearing in the press began to take on accuracy, dignity, and value. Now all the large dental organizations make appropriations for publicity counsel. They should make larger appropriations. Excellent examples of skillful reporting are the following stories to the press written and released by Julian J. Jackson for the Chicago

CLINICAL AND LABORATORY SUGGESTIONS

Form to be Used by Contributors

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THE DENTAL DIGEST
708 Church Street
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From:_____

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Subject:_____

Explanation of Procedure:

Sketch:

$10 will be paid to author on publication of accepted suggestions.

Dental Society during the 1946 Mid-winter Meeting:

Granger on Prosthetics . . .

Man does not chew by opening and closing his mouth; he chews by moving his lower jaw only, Ernest R. Granger of Mount Vernon, New York, told dentists attending the eighty-first Annual Midwinter Meeting of the Chicago Dental Society in the Stevens Hotel in February. Presenting a paper on the mechanical biologic factors involved in the construction of partial dentures, Doctor Granger, who is a member of the oral surgery staff of Columbia University, said:

"A human being does not chew by opening and closing his mouth. . . . Rather, he chews by moving his mandible (lower jaw) through a very complex, very exact, and beautifully coordinated series of planned interferences."

Therefore, he pointed out, all mechanical replacements must fit in and function perfectly with the entire mouth. There must be an exertion of force by and to the teeth and their supporting structures, for the health of the mouth is dependent upon the proper exertion of such force.

Pointing out that dentists must not be technicians practicing a mechanical art, but rather healers dealing with a vital organ of a healthy body, Doctor Granger said: ". . . we cannot put whatever teeth we like into a mouth and expect that mouth to adapt itself to them, but neither can we neglect to create tooth forms which will, in function, exercise that measure of control which is essential to the proper coordination of all these parts. But the teeth must all share this control equally among themselves and in complete harmony with each other as well as with the rest of the organ.

"Dentistry today is acutely in need of a practical, rational philosophy based upon a biologic concept of the human mouth; a biomechanical basis for restorative practice. . . . In all truth, reconstruction (of teeth) to be completely successful, requires a philosophy more than a technique."

(*Continued on page* 157)

(*Continued from page* 152)

Reconstruction, Doctor Granger explained, is doing the things which should have been done in the beginning, which have always needed doing; that at long last the dentist is going to treat the whole mouth.

In conclusion, Doctor Granger declared: "Only by actually developing a biologic philosophy, and actually using it in our daily work, will we achieve that status that dentistry can and should occupy."

Ireland on Pedodontics . . .

If American dentists do not improve their services to children, another health agency will take over that work for them, according to Ralph L. Ireland of Lincoln, Nebraska, president of the American Society of Dentistry for Children:

"Adequate dental service for children imposes on the dentist a greater responsibility to his young patients than he has, in the past, been willing to assume. Unless dentists begin to practice more and better dentistry for children, some other health agency will assume the responsibility for them."

Doctor Ireland, who is also secretary of the Section on Dentistry for Children and Oral Hygiene of the American Dental Association, said that dentistry should be proud of its record of service to adults, but that at the same time they should be ashamed of the service provided for children.

"American dentistry is recognized as the best in the world," he said. "In no other country has dentistry reached the height that it has in the United States. Of this fact every dentist should be proud. However, the dental service which has been allotted to the children in the United States is very much inferior in quality and quantity to that provided for adults. Of this fact every dentist should be ashamed.

"The reasons which dentists have used for not assuming their responsibilities to the children in the United States are, for the most part, selfish and are not usually defensible. Unless the private practitioners of dentistry do an 'about face' and begin to

practice more and better dentistry for children, some other health agency will assume the responsibility for them."

According to Doctor Ireland, the dentist who treats children should understand the management of the child in the dental chair; have a working knowledge of the operative procedures necessary for the care of the primary and young permanent teeth; supervise the child's dental growth and development as they relate to the growth and development of the child as a whole; and recognize the intra-oral manifestations of general and local diseases.

"The child's association with dentistry," he said, "will be more pleasant if the dentist's approach is based on an appeal to the child's special senses; recognition of the child as an individual; careful choice of words and an assuring tone of voice; proper introduction to instruments; and consideration of the comfort of the child in the operating room."

Hoffman on Medicine . . .

Penicillin is a "lopsided miracle," according to William S. Hoffman of Chicago. Doctor Hoffman is acting research director of Hektoen Institute for Medical Research of the Cook County Hospital.

Discussing PENICILLIN—ITS USE AND POSSIBLE ABUSE, he said: "Penicillin has been called the miracle of modern medicine. But it is a lopsided miracle. It can cure lobar pneumonia, but cannot touch the common cold. . . . In other words, penicillin, though a remarkably effective therapeutic (healing) agent against a variety of serious infections, is by no means a panacea for human ailments."

The dramatic clinical success of penicillin does not lie so much in its destructive action on a great variety of bacteria, the speaker pointed out. Its success is due in good part to the fact that it is so harmless.

"Yet in this innocuousness lies the real clinical danger of penicillin," Doctor Hoffman declared. "For it is so easy and safe to use that it can be used without regard for the correct diagnosis, without regard for the proper dosage, and with a neglect of

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136-C

the well established general principles of medicine, dentistry, and surgery in the adjuvant (assisting) management of disease."

Just as in the case of sulfonamides, Doctor Hoffman stated, bacteria sensitive to penicillin become resistant if grown in concentrations of penicillin too small to kill the bacteria. "A patient treated with too low a dosage of penicillin or with too great an interval between doses, or for too short a time, may recover from his illness but may harbor the newly resistant organism, which may later re-infect him or infect another person. The infection may then not respond to penicillin."

This danger, he said, is probably greatest in cases of topical (external) treatment with penicillin and with oral penicillin. It may be present in any case where penicillin is administered without regard to the blood levels achievable or the sensitivity of the bacteria that are to be treated.

"In the realm of dentistry and oral surgery," he declared, "brilliant results have been reported in the treatment of . . . Vincent's infection (trench mouth). . . . Topical application of penicillin as a spray, or as lozenges, or in cotton pledgets, or as a mouthwash, or even in ice cream, have been reported as beneficial and able to shorten the duration of the disease."

Doctor Hoffman further pointed out that "it would be regrettable to bring into disrepute a remedy so remarkable as penicillin by prescribing it as a tonic. It is also poor clinical judgment to risk needlessly the sensitization of patients to penicillin and thus prevent its use on a serious occasion. Besides . . . there is only a limited quantity of penicillin available and it should not be wasted."

In conclusion Doctor Hoffman reported that now that the chemical formula of penicillin is known, there is hope that it can be synthesized.

Hauser on Orthopedics . . .

When a dentist remarks, "Oh my aching back," he means it literally, according to Emil D. W. Hauser of Chicago, well known orthopedist. According to Doctor Hauser, dentistry is often just a pain in the back to the dentist—the result of "prolonged standing and the prolonged retention of awkward positions that are demanded of the dentist in carrying out his work." Doctor Hauser is assistant professor in bone and joint surgery at Northwestern University School of Medicine.

In discussing HEALTH AND POSTURE OF THE DENTIST, he said: "From a study of my case histories of dentists, I have found that they most commonly complain of pain in the back. This pain may be in the lumbosacral or sacroiliac area, in which case it is often associated with pain down the lower extremity, or it may be in the cervical (neck) area, in which case the chief complaint of the dentist is the pain and loss of strength in the arms and hands. Occasionally the pain occurs across the dorsal area with pain referred over the chest and upper part of the abdomen."

These conditions, the speaker said, are all due to what is spoken of in orthopedic terms as a "functional decompensation." This means that there is an imbalance between the capacity of the weight-bearing structures of the body and the demand made upon them. The result of this strain, or functional decompensation, is muscular fatigue, irritation of the weight-bearing joints, muscular spasm, nerve involvement, and increase in the curves of the spine, he reported.

If the dentist is to stand up and continue in his profession, he first must lie down, Doctor Hauser declared. "If the dentist would take enough time at noon so that he could lie down twenty minutes, that would give the muscles a chance to recover from the fatigue of the morning. In other words, as far as the back is concerned, his day would be divided in half. . . . By the time the dentist has come for treatment, however, he has exhausted all his reserve, so that in order to rehabilitate himself and still carry out his work he may find it necessary to rest at more frequent intervals."

In severe cases, Doctor Hauser pointed out, complete bed rest and even hospitalization with weights on the legs to obtain relaxation of muscle spasm is required. It may even be necessary to wear a plaster of paris jacket to restore the structures to normal.

To prevent occurrence of an aching back, legs, and feet, the orthopedist suggested avoidance of fatigue by periodic rest, regular exercises which are controlled and graduated, proper eating, and relaxation by means of an interesting avocation.

In conclusion, Doctor Hauser said that the demand made upon the body structures of the dentist has been tremendously heavy during the last five years and "has resulted in a high morbidity as well as fatality." He advised dentists, "It is important that you plan and think in terms of living while you are working, and also think in terms of gradually decreasing your occupation demands as you get older. I am opposed to the conception that you can work intensely for a certain period of years so that you can retire earlier and enjoy yourself. I think you should live as you go along, and enjoy yourself while you are working."

Kesel, *et al*, on Research . . .

Development of small amounts of ammonia (not household variety) in the mouth may explain the absence of dental decay in some fortunate persons, according to research reported to the Midwinter Meeting by Robert G. Kessel, J. F. O'Donnell, Ernst Kirch, and Edward C. Wach of the University of Illinois, Chicago Campus, in their $500 prize-winning essay.

The essay was read by Doctor Kesel at the second general session, when presentation of the prize was made by Joseph B. Zielinski, president of the Chicago Dental Society.

The research further indicated that the artificial use of ammonium compounds may be a means of halting decay in those persons whose normal mouth secretions do not produce the

natural ammonia nitrogen. Doctor Kesel, a prominent Chicago dentist, is a member of the faculty of the University of Illinois Dental College and editor of *The Fortnightly Review* of the Chicago Dental Society.

In the essay THE BIOLOGICAL PRODUCTION AND THERAPEUTIC USE OF AMMONIA IN THE ORAL CAVITY IN RELATION TO DENTAL CARIES (DECAY) PREVENTION, which won first prize in the Chicago Dental Society's annual essay competition, Doctor Kesel reported that the mouths of persons who are normally free of decay possess a quality which is able to produce ammonia nitrogen and also the ability to check the growth of certain bacteria which have been shown to exist in large quantities in all cases where teeth are actively decaying. He said:

"The development of ammonia nitrogen in the oral cavity may be responsible for the absence of dental caries which some individuals naturally exhibit. It may not be formed in the mouth in large quantities, but if it is produced by natural methods in small continuous quantities at the strategic points on the teeth where cavities develop, it may be effective in preventing the decalcification of the tooth substance.

"Amino acids are present in human saliva and may be utilized for the production of ammonia by the enzyme (chemical activators) systems present in the oral cavity.

"Ammonia introduced into the mouth artificially has a limiting effect on the acid-forming bacteria, and clinical observation over a longer period of time may reveal a reducing effect on caries (decay) activity."

The experiment was conducted by incubating saliva from decay-immune persons for one week. During the incubation period the saliva developed an ability to destroy acid-producing bacteria which are believed to be responsible for tooth decay, Doctor Kesel said.

Further experiment showed that the substance responsible for destroying the acid-producing bacteria was a volatile (rapidly evaporating) substance— ammonia. "We found," he said, "that when we analyzed incubated salivas directly for ammonia content the inhibiting properties (halting acid-forming bacteria) were directly dependent upon the amount of ammonia they contained. If they had more than 0.5 of a milligram per cubic centimeter, they were inhibitory."

The question then arose, Doctor Kesel said, as to where the ammonia comes from in these naturally immune people. "We have learned that a source is the amino acids these salivas contained. Now we are analyzing salivas for their amino acid content by quantitative methods developed."

As to the clinical uses, Doctor Kesel reports: "We have incorporated ammonium compounds in a tooth powder and a mouth rinse, and we have had a series of patients using these preparations for a period of five

months and there is evidence that the acid-producing bacteria are being reduced in numbers."

However, he points out, it is too early to determine what effect that will have on decaying teeth. A study of decay requires from eighteen months to two years to learn if treatment is beneficial.

Miller on Economics . . .

Americans value their comforts far more than they do their health, said E. Carl Miller of East Cleveland, Ohio.

"There seems to be a growing trend among those who are interested in socialized dentistry," Doctor Miller said, "to emphasize the high cost of dental service.

"There are two ways to look at this question. First, dentistry is expensive only when the teeth have been neglected. The neglect may be due to willful failure to have dental service or it may be due to the ignorance of the dietary causes of decay. Second, the dental profession as a rule cannot be charged as the recipient of an enormous income.

"Surely the national bill for cosmetics is far greater, and it is common knowledge that the American people value their comforts far more than they do their health."

Doctor Miller told the dentist listeners that if they regard their work as valuable they should demand the intrinsic remuneration for that service. "If we impart the value of that service to our patients," he said, "they in turn will appreciate its worth. Surely intelligent patients well understand that an operation that takes an hour or more is more valuable to them than one that requires a few minutes. Also they appreciate restorations that are polished, and become critical of the unpolished, discolored kind.

"Why we as a profession have become accustomed to selling fillings instead of service is questionable. Laymen are used to service charges for work done by various tradesmen."

Doctor Miller continued:

". . . we must remember that we are a health profession and there can be no rule of set values for each service rendered because the human anatomy presents various problems of a pathologic and functional nature, no two of which are alike.

"From the standpoint of the patient, he must be educated to appreciate his natural dentition enough so that he will be willing to sacrifice his time and the cost of keeping that dentition in a healthy and functional condition.

"From the standpoint of the dentist who is interested in having his patient enjoy the pleasure of his natural teeth, it is certainly perplexing that remuneration for that service is as a general rule far below the income for prosthesis (artificial teeth)."

Doctor Miller's discourse on dental economics came as a part of his discussion of AMALGAM CLINICAL OBSERVATIONS AND PRACTICAL SUGGESTIONS IN ITS USE in which he related characteristics of the alloy which many dentists use in filling teeth.

(*Continued on page* 164)

Bierman on Pedodontics . . .

The dental profession's use of the term "temporary" in connection with children's first teeth has done much to retard and inhibit dentistry for the child patient, according to C. W. Bierman of Minneapolis, Minnesota. Discussing the practice of children's dentistry, Doctor Bierman said:

"In approaching this subject let us all agree and bear in mind that the first teeth in a child's mouth are not *temporary* but are the deciduous or foundation teeth. That damnable word 'temporary' has done much to retard and in many cases actually has inhibited any dentistry whatsoever for the child patient. Please remember that anything of a temporary nature has little or no value."

Doctor Bierman urged that "the word 'temporary' be stricken from our dental vocabulary when speaking of the deciduous or foundation teeth."

He pointed out that the average parent knows very little about the dental health of his child, because he does not realize the importance of retaining the deciduous teeth for their full cycle of usefulness.

Waldron and Peterson on Surgery . . .

Sulfonamide and penicillin therapy is to play a greater part in the practice of every dentist in the near future, members of the Chicago Dental Society were told by Carl W. Waldron of Minneapolis, who read a paper which he and Ralph G. Peterson, also of Minneapolis, had prepared on the management of oral infections.

"The frequency of oral infections makes it imperative that dentists have a fundamental knowledge of the diagnosis in order to institute adequate measures for their control and effective treatment," Doctor Waldron said. "Many infections are potentially serious even to the extent that a fatal outcome may ensue."

Doctor Waldron pointed out that sulfonamides and other chemical agents were used extensively in the care of war wounds and much enthusiasm was expressed regarding local application, but, in the final analysis, the disadvantages were shown to outweigh the advantages. He said that the progress in wound management points away from the introduction of any chemical agent into a wound for its supposed antiseptic effect.

"It has been my good fortune to visit a large number of Army General Hospitals, including seven of the nine designated Plastic and Maxillofacial Centers," he told the audience. "I have had opportunity to observe firsthand the results of skillful surgical exploration and treatment of infected tissue sinuses. The efficiency of continued penicillin therapy has been thoroughly demonstrated in cases of this type. There is prompt and spectacular healing of infections of several months' duration after adequate but conservative surgical debridement (cleaning).

"No greater therapeutic confusion has ever been manifested than for the relief of 'trench mouth.' The war experience of dental officers afforded opportunity to use penicillin in large numbers of patients with acute 'trench mouth.' The time required

for cure was cut in half or better by exclusive penicillin therapy."

Doctor Waldron told the members that a penicillin "pack" had also been devised to treat ulcerated areas on the lip, cheek, tongue, tonsils, and pharynx. He said that a water-soluble cream, resembling vanishing cream, formed an excellent vehicle for penicillin and did not in any way inhibit its action.

"The x-ray treatment of acute infections in conjunction with chemotherapy and surgery has been advocated but has not found general favor," he added. "However, since the advent of penicillin the use of the therapeutic adjunct has been less frequently reported. The effect of penicillin in the prevention or cure of meningitis and brain abscess has not yet been fully evaluated, but the important relationship of dental infection and infections of the central nervous system should be greatly emphasized."

(Continued on page 167)

Leading periodontists acclaim the ingenious *twisted-handle* of the D.D. Tooth Brush. Set at a forty-five degree angle, it facilitates proper placement of the brush on the teeth . . . almost automatically insures desirable rolling up and down movement, for correct brushing and massage.

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Cahn on Pathology . . .

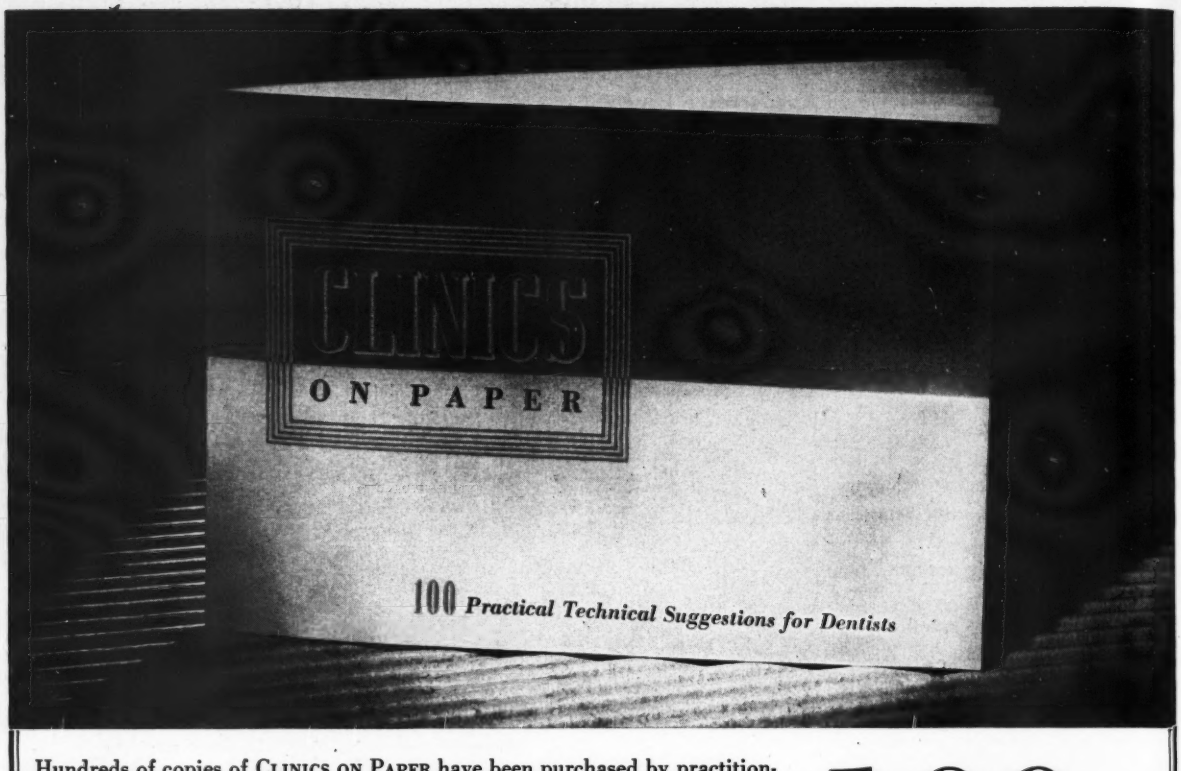
Vitamins, hormones, and allergies, all play an important role in mouth health, Lester Cahn of New York City said. In a discussion of the "pathologic processes of the oral mucous membrane," Doctor Cahn pointed out that bacteria fungi of many varieties and viruses inhabit the mouth. However, "during health they are innocuous, but when the tissue tone is lowered through either local or systemic disease, these apparently harmless micro-organisms become active and incite trouble."

Doctor Cahn discussed the mechanism of vitamins, hormones, and allergies as contributing factors to mouth health: "The function and integrity of epithelium (covering skin of the gums) is evidently dependent upon an adequate supply of vitamin A. In its absence epithelial atrophy (nutritional disorder) occurs. The B complex vitamins, notably thiamine and nicotinic acid amide, aid in the promotion of cellular oxidation." Vitamin C is apparently necessary to the integrity of certain mesenchymal (connective tissue) cells.

Doctor Cahn's assertion that hormones play a part in contributing to changes in the oral mucous membranes is based on evidence that lesions appear in the mouths of women before menstrual periods and that existing pathologic conditions are frequently aggravated at this time. . . . I have observed instances, as have Heinemann and Anderson and others, of women who continually had menstrual oral lesions that had completely disappeared during pregnancy. Oral disease of endocrine origin has been found mostly in women."

Doctor Cahn discussed the possible role of allergies in mouth infections: "The detection and source of the irritating substance may be difficult to find, because sensitization may develop only after repeated use with impunity of a drug or a chemical. Another baffling fact is that only a localized area may become sensitized although the entire part has been exposed. An explanation for this is that sensitization may occur in sites previously traumatized (injured)."

(*Continued on page* 169)



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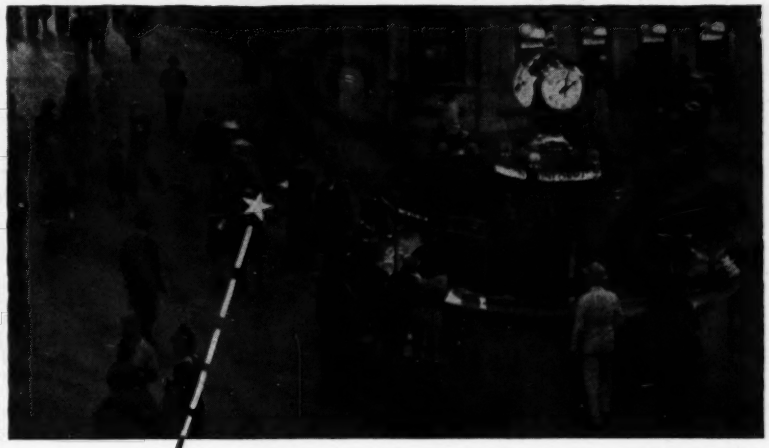
Doctor Cahn concluded: "The one thought that I should like to convey is that every case of disease of the oral mucous membrane demands a thorough and complete study. This may entail a great deal of effort on the part of the clinician and sometimes annoyance to the patient, but the end result will many times justify the labor."

Good Publicity Should Begin at Home . . .

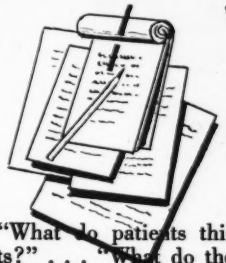
Some of the specialized groups within American dentistry should give more attention to reporting their activities to other dentists through the professional press. It should be important to oral surgeons, orthodontists, prosthodontists, and others, that their points of view and accomplishments be made known to general practitioners. The specialists receive most of their patients from referral by the general practitioners. The two can work together for the good of the patient if they understand each other's problems. It is usually easier for the specialist to understand the general practitioner because he probably served his own years in general practice.

So far as I have observed, the specialized groups have done little to improve the basis of understanding with the general practitioners. Many general dentists have the notion that the specialist is little more than a chap with audacity and a higher income. If this attitude is widespread, which it is (listen to the convention small talk), the specialized groups should make an effort to prove that they possess what the law demands: a higher degree of knowledge, skill, and judgment than is required of the general practitioner. A good beginning would be publication, in the *general* dental journals, of some of the material presented before the specialized groups. Some of this is done but, unfortunately, much of the valuable material given before the specialized groups is never published in *any* journal. The knowledge that is lost to the profession by nonpublication is appalling. Good publicity should begin at home—within the profession.—E. J. R.

In your ORAL HYGIENE this month



The railroad stations were by far the most ideal places to talk to people.



DENTISTS— Meet The People

"What do patients think of dentists?" . . . "What do they think of dentistry?" . . . These are the questions which a dentist-reporter, Robert H. Brening, set out to answer. Questioning men and women in all income brackets, he found that their answers to his queries "were indeed direct and sometimes even embarrassing to a member of the profession." Doctor Brening has condensed his findings into three exceedingly interesting—and important—articles. The first of the series appears on page 418 of the March issue of Oral Hygiene. The other two will follow in subsequent issues.

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Do you use fluorine therapy in your practice? . . . or are you waiting for more information on this new method of preventive treatment? . . . Doctor R. Reed Smith has had great success in reducing the incidence of new caries in children's teeth by as much as forty to fifty per cent through topical application of fluorine. In the case of adults, treatment for the prevention of caries is not nearly so successful. However, fluorine treatment for gingival tissue recession in adults is highly successful. Doctor Smith gives detailed description of his techniques, and says that fluorine "promises to do for dental science what the sulfa drugs and penicillin do for medicine." You will want to read this practical, helpful article, "Improve Your Practice With Fluorine Therapy." Turn to page 422 of the March issue.

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"Dentistry in the Veterans Administration" is a timely topic of particular interest to dentists seeking a career in government service. George B. Fritz explains that the new dental program will require additional personnel; that promotions will be prompt and will be based on individual merit; that there are no age limits; and that retirement benefits will be on the same basis as Civil Service.

★ ★ ★

"The Human Elements in Denture Service," by Carl O. Flagstad, D.D.S. . . . "Build Your Own and Like It," by Jerome Salzman, architectural engineer . . . "How Can Television Become Dentistry's Greatest Asset?," by Gerald L. St. Marie, D.D.S. . . . "What the Physician Expects of the Dentist," by Morris W. Kilgore, M.D. . . . "Help Your Colleagues Returning From Military Service," by Alvie R. Livermore, D.D.S. . . . and all of the regular features and departments . . . round out an issue which accurately reflects the great variety of the dentist's current interests.

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